Release 4.0

DCD IV™

Data Correlation and Documentation

System

For the **IBM OS** Environment

User's Manual

Marble Computer Inc. – The Software Maintenance Company

DCD IV

Data Correlation and Documentation System

User's Manual

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INTRODUCTION

DCD IV (Data Correlation and Documentation System) is a maintenance tool for use in the ongoing maintenance of COBOL programs.

DCD IV provides complete documentation of a COBOL program automatically and now provides Tracing & Analysis.

The Alternate Compile Listing Facility of DCD IV provides an alternative to using the standard compile listing of the COBOL compiler.

The Tracing & Analysis and Other Reports Facility of DCD IV provides both Tracing within a program AND a method of analyzing the use of data throughout the program on multiple programs at a one time.

DCD IV can produce work files, which may be used in re-engineering Computer Aided Software Engineering (CASE) projects.

The JCL PROC Analysis Reports Facility of DCD IV provides a method for producing reports on JCL PROCs.

DCD IV supports all ANSI standards for COBOL and supports all IBM/OS mainframe operating systems.

DCD IV supports commonly used software packages that interface with COBOL such as the commonly used CA-Optimizer. See "Other Features Supported" in the Alternate Compile Listing Facility section for a full list of the features supported by DCD IV.

With release 4.0 of DCD IV, PC analysis of COBOL is supported with CAT-ACL, now a part of DCD IV. See our web site for more information on CAT-ACL and CAT.

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IBM is a trademark of the International Business Machines Corporation.

CA-Optimizer is a software package marketed by Computer Associates International, Inc.

COBOL/Aid is a software package marketed by Compuware Corporation.

Panvalet is a software package marketed by Computer Associates International, Inc.

Librarian is a software package marketed by Computer Associates International, Inc.

Because of work processing constraints, examples shown in this document may not be identical to actual results obtained.

MARBLE Computer, Inc. would like to thank the many people who have contributed their assistance, suggestions, and guidance in the development of DCD IV and for providing feedback for continued improvement of the software and the documentation in this manual.

DCD IV and prior software system DCD III has a client base of over 600 mainframe installations.

MARBLE Computer, Inc.
P.O. Box 920692
El Paso, Texas 79902
Phone: 800-252-1400 / 915-845-0963
Fax: 915-845-7918
E-Mail Address: info@marble computer.com
Web Site: www.marblecomputer.com

DCD IV

New Release Highlights

(See the end of this section for the most current release highlights.)

I.

New Release Highlights
Release 1.1
April 1, 1989

This release of DCD III has more changes within it than all prior releases of DCD II combined. In essence, the entire package has been completely rewritten. Listed below are a few of the major changes and the overall effect that they have on the new package.

1. The JCL it takes to execute DCD III has been simplified and reduced. For example:

   25 DCD WORK FILES have been reduced to 6
   10 DCD PRINT FILES have been reduced to 1

   The CPU savings here in allocation and de-allocation are substantial.

2. The narrative documentation printed alongside the Data Division on the Source Listing has the most significant change of this new release. In prior releases of DCD II, this narrative was in English. The new narrative is now in COBOL, making de-bugging of the source code much faster. Further, the narrative is more concise. For example, what used to be lumped together under the phrase:

   (LOGIC OPERATOR)

   will now print in one of these formats:

   IF # < 01 (885)
   IF # = S-NEXT-NARRATIVE-CODE @309 (909)
   IF # NOT > 25 (892)
   IF NOT # (664)
   IF # IS NUMERIC (871,879)
   IF WS-MAX-PD-DIGITS @322 > # (1005)
   PERFORM-UNTIL # = 0 (951,974,1013)

   or in another more appropriate format.

   The narrative now relates directly to the exact Procedure Division Statement.

3. The amount of paper produced by DCD III has been substantially reduced. The DCD III Source Listing and Data and Procedure Division Cross Reference Reports combined are now about the same size as a compiler listing with the same reports. Prior to this release, the DCD II listing was twice the size of the compiler listing.

4. The Data Division and the Procedure Division Cross Reference Reports are now condensed rather than expanded. The result is a 70% savings in paper over a compiler cross reference and a 90% savings in paper over the old DCD II Expanded Cross Reference. The reason this can be done is due to the new and more complete narrative in COBOL in the Data Division.

5. The Data Analysis Report (now the System Data Name Cross Reference) is now in a condensed format which saves paper when printing this report.

6. DCD III has been separated into three distinct facilities:
   - The output from the program side, now referred to as the Alternate Compile Listing Facility, is designed to more closely resemble the COBOL compiler output.
   - Most reports previously available on the system side are now available under the Other COBOL Reports Facility.
   - The Data Set Analysis Reports formerly on the system side, have been moved to the JCL PROC Analysis Reports Facility.

7. Five new reports were added in the Alternate Compile Listing Facility:
   - CALL Statements
   - COPY Statements
   - Figurative Constants
   - Literals
   - Special Registers

   These reports print one after the other without a page break. In many cases, all five reports will take only a page or two to print out.

8. Several reports that were available on the program side have been moved to the Other COBOL Reports Facility.

9. Producing the Layout Report is now easier and additional options are available to customize the report.

10. The File Analysis Report has been re-named the System Record Analysis Report. Furthermore, where the File Analysis Report produced only direct flags for Set, Used and Tested, the System Record Analysis Report produces both direct and indirect flags.

11. It is now possible to access DCD work files for use in the re-engineering of COBOL programs and systems. This approach to Computer Aided Software Engineering (CASE) gives the Software Engineer a new dimension in the maintenance of COBOL systems.

12. The source code of this new release (maintained by MARBLE Computer, Inc.) is top down, structured and easier to maintain, allowing us to better serve our customers when technical problems arise.

13. The error messages have been expanded and completely re-organized.

14. A Call Report Form is now available for FAXing technical problems and questions to MARBLE Computer, Inc.

15. The CLIST Feature available on prior releases of DCD II is no longer supported. Users wishing to maintain it on their own are welcome to do so.

16. The DCD III User's Manual has been completely re-written.

New Release Highlights
Release 1.2
April 1, 1990

This is the second release of DCD III. It contains in excess of 120 modifications for small discrepancies (most reported by our users) and the new enhancements listed below.

1. The System Record Analysis Report is now selectable by COPY member name as well as by record name.

2. The Data Analysis Report may now be limited by the control cards used for the System Record Analysis Report.

3. Further support of IBM's VS COBOL II Release 3 has been added as users begin to migrate to that compiler. Items now included for Release 3 include the following:

    a. Reading the compile listing of Release 3, which is significantly different than the output of other compilers.
    b. Handling of BINARY and PACKED-DECIMAL clauses.
    c. Allowing both single apostrophes and double quotes within the same program.
    d. Adjusting our scanning of COBOL programs to allow for reference modification now available within Release 3.
    e. Documenting the new GLOBAL and EXTERNAL clauses available within this new release.

4. Further support of SQL by resolving INCLUDE's as COPY's.

5. For the CA-Optimizer users, continual support has been given to resolving the compiler listing (already formatted by this package) as newer versions are released.

New Release Highlights
Release 1.3
April 1, 1991

The following enhancements have been added to the new release of DCD III:

1. A numeric FROM and TO position relative to the beginning of the record (e.g. 1-10,12-13) is now available to be placed within columns 73-80 of the DATA DIVISION for all the data names found there. Options are available to allow other uses of columns 73-80.

2. Selection is now available on the Verb Analysis Report. Up to ten (10) different verbs may be used at any one time for selection.

3. Further support of IBM's VS COBOL II, Release 3 is included as listed below.

    - Saving formatted information from the Release 3 listing and including that information within the DCD III Source Listing (see R3N options).
    - Handling of EVALUATE/WHEN statements.
    - Document data name references within the parentheses of reference modification.

4. Support is now provided for Release 3 of the CA-Optimizer.

5. Within the CASE and Data Dictionary files:

    - The COPY members of the CASE DATA DIVISION records are now included on the installation tape.
    - Additions to verbs handled are included within the documentation.
    - In the Data Dictionary File, multiple programs may now be processed at one time.

6. An option is now available to distinguish between COBOL 68 and COBOL 74.

New Release Highlights
Release 1.4
April 1, 1992

The following enhancements have been added to the new release of DCD III:

1. A new report 'The CALL Hierarchy Report' has been added with static and dynamic calls handled. Control statements allow deleting common calls and adding non-COBOL programs that call other COBOL programs for keeping the report complete.

2. The JCL Analysis Report (formerly two sequences - DDNAME and DSNAME) now has an additional sequence added for listing formatted DDNAMEs and DSNAMEs in the same order as they are in the JCL. Primary sorts on PROC name and program name are now allowed. Programs with no ddnames may now be listed. DDNAMEs which have DATA, DUMMY, DDNAME=, SYSOUT, or *, may now optionally be excluded.

3. A new JCL Report is now available for reporting JOB names and PROC names from JOBLIB members.

4. A new option (EIB) will invoke the CICS copy member DHFEIBLK into the program for CICS programs that have not been run through the CICS pre-compiler.

5. The DATA Analysis Report has been enhanced as follows:
   - Option D88 lists all values when multiple values are used within one 88 entry.
   - Options (DA1 to DA5 and DAL/NODAL) allow for sorting data names after omitting leading numeric digits. This allows similar data names to be reported together.

6. The LAYOUT report has been enhanced as follows:
   - Headings have been modified for both the LAYOUTs and the Table of Contents for LAYOUTs.
   - The page number has been moved from the bottom to the top of the report.
   - When the LOR option is used:
     a) SECTION is removed from the report.
     b) Sequence numbers are removed from the report.
     c) Member name is put on the Layout Report when the Member Fetcher Proc is used.
   - A date has been added to the report.

7. The support of our compile mode has two changes:
    - Support has been added for our handling of a change in the formatting of the CA-Optimizer.
    - Support has been added for our handling of a change in the format of the Release 3 VS COBOL II COBOL compiler.

8. Two items of support were added for VS COBOL II:
    - DAY-OF-WEEK was added as a SPECIAL REGISTER.
    - The use of no data name at the group level is now handled.

New Release Highlights
Release 1.5
April 1, 1993

1. ISPF Panels are now available for the execution of DCD III.

2. A new option NIS (Narrative In Sequence) has been added to allow a different sort sequence for the Data Division narrative. The current default for the narrative uses the COBOL verb (ADD, IF, MOVE etc.) as the primary sort. When this option is used, the Narrative uses the ascending Procedure Division sequence number as the primary sort. This new option affects three DCD reports:

    - Source Listing of the Alternate Compile Listing Facility
    - Data Name Cross Reference of the Other COBOL Reports Facility
    - LAYOUTs of the Other COBOL Reports Facility

3. Beginning support is provided for IBM's new compiler 'IBM SAA AD / CYCLE COBOL / 370'. Continuing changes have also been made for release 3 of VS COBOL II, especially in COMPILE mode of the ACLF.

4. For those who use CA-Optimizer with VS COBOL II, we have made changes to keep pace with modifications so that DCD reads CA-Optimizer listings correctly.

5. Small problems in the handling of SQL code (EXEC SQL) have corrected.

New Release Highlights
Release 1.6
April 1, 1994

1. DCD III now handles COPY members within COPY members. Both COPY reports (one in ACLF and one in OCRF) show the nested level of the COPY member.

2. All host variables with SQL SEARCH PREDICATEs are now fully documented instead of just the first variable.

3. Additions and corrections to our new ISPF panels:
   - Headings have been changed to conform with requests from users and present a more SPF look.
   - The COLORs have been changed to conform more with typical usage.
   - Corrections for problems reported within the first year's usage have been made.

4. Release 4 of VS COBOL II is now supported. Earlier releases may not fully support this newer release.

5. Group usage POINTER and INDEX is now supported.

6. Enhancements have been made to support COPY REPLACING pseudo- text as it is being used for advanced levels of prefix substitution within COBOL programs.

7. A new option has been added to the LAYOUTs when documenting COPY members or documenting individual records not directly coming from a COBOL program.

New Release Highlights
Release 1.7
April 1, 1995

The following enhancements have been added to this release of DCD III:

1. SPF panels have been modified to allow for COBOL 370.

2. Other enhancements and corrections have been made to the SPF panels initially released by MARBLE two years ago.

3. Handling of the COBOL verb EVALUATE has been made to allow for NUMERIC and NOT NUMERIC.

4. FROM and TO positions of fields within 01 records used in three DCD III reports,
    a. Alternate Compile Listing
    b. LAYOUTs
    c. System Record Analysis

    have been enhanced to allow for two extra digits as compilers are now allowing individual record sizes greater than 6 digits.

5. Enhancements have been made to both correct problems and to conform to newer compiler enforcement of USAGE when the usage is specified both on a group field and an elementary field within that group.

New Release Highlights
Release 2.1
June 1, 1996

The following features and enhancements are included in this new release of DCD III.

1. Tracing of Literals for user selected fields is now available with this release. Literals are traced through several (17) levels of MOVEs & SETs for user selected fields. Three different reports show possible Literals:
    - for each field traced
    - showing where the literal came from
    - showing the possible paths to arrive at a field

   Samples of these reports are provided in Other COBOL Reports Facility pages.

2. For VS COBOL II COBOL user's (Release 3 or higher) and COBOL 370 & higher users, a new DCD III option (**PMO**) is added for COMPILE MODE to trap HEX OFFSETS from the compiler HEXLOC cross reference map and then match merge these LOCATIONS into the DCD III ACLF source listing. These locations are inserted alongside each Procedure Division source code statement.
    - As we anticipate the option to be heavily used, (from numerous user comments), this option is defaulted, too. It may be turned off.

3. Two new options are available with the CALL Analysis Report and two new options are available with the COPY Analysis Report for individually producing the reports in just PROGRAM sequence or in just COPY or CALL sequence. Previously, when producing these reports, both sequences of either report came out together.

4. Two forms of Qualification of Paragraphs are now with this release handled by DCD III. They are:
    a) GO TO DUPLICATE-PARAGRAPH-NAME will go to the paragraph name within the section which contains this GO TO statement.
    b) GO TO DUPLICATE-PARAGRAPH-NAME OF SECTION-WITHIN-PROG will go to the duplicate named paragraph within the section specified.

5. Initial handling of verbs using COBOL 370 Intrinsic Functions is now provided. Advanced handling of Intrinsic Functions is now under development.

6. SYNC is now handled on an 01 record.

New Release Highlights
Release 2.2
May 1, 1997

The following features and enhancements are included in this new release of DCD III.

1. Modifications are included to insure correct handling of our software into and beyond the **Year 2000**.
   - The control password is changed from a two digit year to a four digit year (from 99 to 9999).
   - The reports listing have all been changed from a two digit year to a four digit year (from mm/dd/**YY** to mm/dd/**YYYY**).
   - CASE generated work files and internal debugging files of DCD III have been modified to incorporate a new 10- character date with 4 -digit year in their header record.
   - The code has been tested to insure that execution will continue normally after December 31, 1999.

2. DCD III is modified to accept the new **IBM COBOL for MVS and VM** in Compile Mode of the Alternate Compile Listing.

3. A method of handling PREFIXs with COPY REPLACING with the use of colons or parentheses by the newest IBM compilers, has been added by user request and to conform with IBM documentation.

   - An example follows:

```
COPY PAYCOPY REPLACING ==:TAG:== BY ==PAYROLL==
```

   where the COPY member contains entries similar to:

```
01   :TAG:.
     05   :TAG:-WEEK   PIC X(02).
     05   :TAG:-DAY    PIC X(02).
```

4. DATA DIVISION literals are now omitted in LITERALS report of the ACLF listing.
   - This will shorten the ACLF listing, saving paper.
   - An option is present to allow a user to re-include them.
   - Documentation is included at the top of the ACLF listing explaining the change.

5. One enhancement and one correction are made in the handling of the SPF option for COBOL 370.
   - The correction now insures an initial default when SPF brings up that panel.
   - The COBOL 370 option now includes the new COBOL FOR MVS AND VM compiler.

6. A new password is provided. It must be used to conform with modification #1 above.

New Release Highlights
Release 2.3
April 1, 1998

The following features and enhancements are included in this new release of DCD III.

1. The newest IBM compiler '**IBM COBOL for OS/390 and VM 2.1.0**' is supported with this release of DCD III. If you install this newest COBOL compiler and immediately experience problems with the COMPILE mode of DCD III, installing this new release will eliminate this problem.

2. Two changes have been made to DCD III's narrative as follows:
   a) Always in Upper Case, DCD III's narrative is now in **lower case** unless changed back through a DCD option.
   b) The use of REFERENCE MODIFICATION in the COBOL program is now shown directly in the DCD narrative as a colon (:) placed next to the operand it is used with.

3. A new report is added to the ACLF (main side) of DCD III. This new report is a '**Condensed VERB Report**' allowing the COBOL program to find infrequently used verbs quickly or to look for possible errors by quickly identifying the use of PERFORM separate from PERFORM THRUs.

4. An option has been added to **allow HEX numbers showing FROM and TO positions** in column 73-80 in place of DECIMAL numbers.

5. A brand new feature has been added for those users doing **Year 2000 Conversions**. (See enclosed brochure.)
   a) For finding those fields for Year 2000 Conversion, a brand new powerful SELECTION language (free format in a COBOL like SYNTAX) has been added.
   b) Immediately for those fields selected, a report is produced showing DCD III□s unique COBOL narrative right under the selected field.
   c) Overlapping fields (and all REDEFINED fields) relating to the selected field are shown in one of two sequences underneath the selected field.
   d) COBOL narrative for each Overlapping or Redefined field is shown underneath each overlapping field.
   e) Nine options are available for controlling this powerful new report.

   Our technical staff is prepared to answer questions concerning this new feature.

6. Enhancements have been made for **PANVALET and LIBRARIAN** users:
   a) Multiple PAN LIBs are now allowed for PANVALET users.
   b) A different way of selecting Librarian modules is provided to prevent security violations in packages such as RACF, ACF2, TOP-SECRET, and others.

(Continued)

7. Advanced handling of **Intrinsic Functions** in COBOL is now handled.

8. Cross referencing is now provided for the COBOL clause (DEPENDING ON Data-Name) providing a reference to assist in locating the Data-Name when it is separate from the table.

9. Changes in the minimum amount of REGION used in SORT packages such as SYNC-SORT have been addressed by upping the REGION used for both SORTREG and overall REGION within all DCD III JCL. Also, it is now possible to externally specify REGION when using the DCD III SPF facility.

10. As always, minor fixes reported during the last year have been added to this new release.

New Release Highlights
Release 2.4
March 1, 1999

A major new feature, Tracing and Analysis is added to DCD III with this release. Parts of this new feature were released last year in release 2.3.

This year, **Full Tracing** and more has been added as shown below.

> ***The bottom line for this new feature is that a programmer can start on a Modification to a COBOL program and within a quick and simple DCD III run, produce a report showing every single data name that will need to be considered in making any changes for any data field in the program.***

For user's who have not completed their Year 2000 conversion, the following is available:

- An option which uses the above Tracing & Analysis Feature to **automatically trace through the program and build an easy to read set of CHANGE LINES** which the user may use **to VERIFY that all changes previously done for Y2K conversion ARE CORRECT!**

If the user has any code still to convert, MARBLE offers Code Changing Software which works in conjunction with the above CHANGE LINE feature to actually change ALL source code and COPY members.

Full features of 'Tracing and Analysis'

1. **Full SELECTION language allowing:**
   - **Simple selection where the user knows which field to select.**
   - **A complete selection language allowing the user a way to select by supplying various criteria.**

2. **Inclusion of all Overlapping (REDEFINEs, Groups, 88's, & other fields) associated with the selected name.**

3. **Tracing through infinite levels to isolate every field that can be tied to the original field or fields selected.**

4. **Complete & Understood Narrative for every field to show all related Procedure Division activity. This Narrative shows the way through each deeper level of tracing.**

5. **Bypassing of some fields where the user determines that a particular trace is not wanted. This allows a user to end a trace through that field.**

Additionally, for any Year 2000 work not done, CHANGE lines can easily and automatically be built to allow the user to verify that his or her Year 2000 changes are accurate.

New Release Highlights

Release 2.5

May 1, 2000

The following features and enhancements are included in this new release of DCD III

1. Several enhancements are made to our new Tracing & Analysis feature. Three specific areas are listed here:
   a) Control statement for SELECTs may now be entered without the **SELECT IF NAME =** prefix. (The user now enters only the name he or she is selecting.)
   b) DDnames now use the **SELECT** and **BYPASS** names for easier recognition
   c) Several areas of the report have been modified including changes in how we report errors and wording changes for easier report understanding.

2. Several SQL enhancements are added for fuller DB2 processing:
   a) Modifications were done for the correct processing of intrinsic functions such as CURRENT DATE and CURRENT TIMESTAMP within EXEC SQL statements.
   b) Additional Host variables within WHERE clauses for SQL CREATE_VIEW SELECT_sub_clauses, UPDATE, and DELETE verbs are now handled.
   c) Additional Host variables within VALUE clauses for the SQL INSERT verb are now handled.

3. Intrinsic FUNCTION handling has been expanded to handle FUNCTIONs **within** FUNCTIONs.

New Release Highlights

Release 2.6

April 1, 2001

The following features and enhancements are included in this new release of DCD III.

1. More enhancements are made to our newest Tracing and Analysis Feature.
   a) Internal Table sizes used in Tracing & Analysis have been increased.
   b) If any of these newer table sizes are exceeded, the run will now continue to end to allow a user to see a partial run.
   c) More attention has been given to error messages to make them more readable.
   d) A problem in looping during infinite tracing levels has been fixed.
   e) A new PARM field has been included to allow the user to limit the maximum trace levels used.

2. Reference Modification in complex AND/OR statements is now allowed for. The Procedure Division Narrative for this has been corrected to document all data names addressed.

3. Special Register 'LENGTH OF' is now processed by DCD III.

4. A special PARM option has been added to invoke older COBOL COPY member handling where the user expects the 01 record name preceding the COPY on the same line to overlap the 01 record name within the COPY member.

5. Documentation on use of the IBM Compiler TITLE statement in Compile mode is included.

6. A problem has been addressed where continuous page feeding occurred when the LNCNT option is set to zero.

New Release Highlights
Release 2.7
April 1, 2002

The following features and enhancements are included in this new release of DCDIII

1. Support in this release is provided for IBM's newest COBOL Compiler "IBM ENTERPRISE COBOL FOR Z/OS ANS OS/390" which runs under the new Z/OS operating system.
   - For clients running the Alternate Compile Listing in Compile *Mode (the normal way of producing compile reports),* this new release will need to be installed to allow us to read this listing and make DCDIII continue to work.

2. A new report is available to produce an INCLUDE report (similar to COPYreport) for all INCLUDEs found in CICS, DL1, and SQL programs in the Alternate Compile Listing
   - For CICS, DL1 or DB2 programs, this report will be produced if INCLUDEs are Found and the COPY parm option is specified.

3. A new report is available and is automatically turned on with the use of SECTIONs to show SECTIONs stand alone without paragraphs included. This report will follow the PROCEDURE DIVISION cross-reference report in the Alternate Compile Listing.

4. DCD III options are more cleanly documented. Default options are now always shown on the parm page indicating clearly that an option is on.
   - Other supporting documentation on the options page promotes user use of DCD III's newer Tracing and Analysis feature.

5. A reference Modification bug within DCD III that caused DCD III to stop running has been fixed.

6. Parm option VS2 is now the default option specifying use of a newer COBOL compiler.

7. A CLASS test has been added for DBCS.

8. The SET verb has been modified to allow for PROCEDURE-POINTER and FUNCTION- POINTER.

9. New RESERVED words have been accounted for.

10. Two new Special Registers (XML-CODE and XML-EVENT) were added.

11. USAGE clauses now account for NATIONAL, FUNCTION-POINTER and PROCEDURE-POINTER.

New Release Highlights
Release 3.1
April 1, 2003

The following features and enhancements are included in this new release of DCD III.

1. **Indirect References** for all data fields have been added in the main source code report of the Alternate Compile Listing.

- Previous releases have shown narrative for each field that is **directly** related to The data field by a direct PROCEDURE DIVISION statement.

- **Indirect references** to this data field via PROCEDURE DIVISION statements to **REDEFINES**, group fields or other fields with overlapping fields were ignored and left for the customer to search out on their own.

- In this release**, Indirect references** are now documented on the Alternate Compile Listing for most fields and on a separate report for large group fields with so many references as to make it not practical to report in the main report. *(If the indirect references are moved to the separate report, documentation on the main report will state that this is being done.)*

- The indirect references will be shown immediately after all direct reference Narrative is complete. A sample of both direct and indirect together is shown Below with the Indirect references in bold font:

  Move TR-CUST-ACCT @722 to # (1356,1482,1941)
  If # = SR-CUST-ACCT @569 (1275,1518)
  Indirectly Changed @895,914 Tested @892,914 Used @892,895,917

- By design, when there is no direct narrative for a field, then indirect references will not be reported unless a special DCD option is invoked. Activity for 88 level Condition names will be shown with the data field that the 88 levels belong to. FILLERs will show no indirect references.

2. The use of double parenthesis is now handled within the use of Reference Modification.

3. Error messages have been corrected to not flag a missing period when an END-EXEC precedes an 01 level.

4. Region size and Sort Region Size have been increased to accommodate changes in newer IBM operating systems.

5. Additional work files have been removed from the JCL that were used for Year 2000 work.

New Release Highlights
Release 3.2
June 1, 2004

The following features and enhancements are included in this new release of DCD III.

1. This version is modified so that all DCD III modules are AMODE 31 compliant to work easily with IBM's newest Enterprise COBOL compiler.

2. The CALL report for listing DYNAMIC CALLs has been modified within the 'Alternate Compile Listing'. Previous versions showed only a Data Division Name within the normal CALL report. This enhanced report will show both the Data Division VALUE and any MOVE literals into the field used for the DYNAMIC CALL to allow for a fuller understanding of how CALLs are used.

3. In the last release, excessive **Indirect References*** were moved to a separate report. In this release, the user has the option to leave all the Indirect References in the main report of the 'Alternate Compile Listing'.

4. As of this release, the user may qualify which **Indirect references*** are included. Just **Changed** references, just **Indirectly Tested**, or just **Indirectly Used**, or any combination of the three. Prior to this release qualification was not allowed.

*** Indirect References** were put into DCD III one year ago in release 3.1

5. A problem occurring when qualification of an higher level name existed, but was invalid for use and DCD III did not put out a message has been resolved and a proper error message is now issued.

6. An error in compile mode where a particular formatting of a PROCESS card ahead of the COBOL program causing an abend has been fixed.

7. A problem where the Verb Analysis was intermittently causing an abend has been fixed.

New Release Highlights
Release 3.3
May 15, 2005

The following features and enhancements are included in this new release of DCD III.

1. The formatting of entries in the CALL report in the Alternate Compile Listing has been modified so that additional Dynamic CALL information added last year, along with prior CALL information and with CANCELs added this year are presented in groups related to each CALL.

2. The CANCEL verb has been added to the CALL report in both the Alternate Compile Listing and in the Tracing, Analysis & Other Reports.

3. Processing of SQL (DB2) statements in COBOL has been modified to insure that the ending END-EXEC will always stop our scanning. In rare instances, the END-EXEC was not caught.

4. Within commented out EXEC CICS statements, not all data division names were always fully documented. This has been fixed.

5. The normal 'End of Member Fetcher' message has to been corrected to remove part of another message that should not be there.

6. Minor corrections to last year's release 3.2 (a major release where all our programs had to be modified) have been made to insure error free processing including the following:
   a) Two different intermittent OC7s, one for the DATA option and another sorting Indirect references have been removed.
   b) In COMPILE Mode, several minor errors have been corrected.
   c) Extra beginning blank lines in the CALL report have been removed.
   d) The incorrect formatting of Narrative of literals used in a CALL statement alongside a MOVE with a LENGTH OF clause has been fixed.
   e) The reporting of incorrect TIME alongside the DATA in some or our reports has been fixed.

New Release Highlights
Release 3.4
March 1, 2006

The following features and enhancements are included in this new release of DCD III.

Three new reports are available in this release of DCD III to assist in the cleaning up of all COBOL programs. They are:

- A report showing all unused 01 records in the program.

- A report showing unused Data Names **that are not** embedded in a COPY member. If there are several data names together where there are group names involved, the largest group field will always be shown in place of showing individual data names.

- A report showing unused Paragraph and Section Names. This report may be used to identify code that is not be accessed. Special attention is used to showing oddities in performs and ENTRY's into the program in relation individually and together with both SECTIONs and with PARAGRAPHs.

Five discrepancies are fixed in this release reported over the last year.

- A fix was included to correct SYNTAX when more than 125 operands were used on one side on an IF statement.

- When error message ACLY6C01-D was issued for a very large program, an OC4 resulted.

- An OC4 occurred in selected sites, when DSN=SYS1.SCEERUN was not used and concatenated ahead of the DCD load library.

- An OC7 resulted when option IREFS was used and there were not data names in the program.

- Infrequently DCD III issued ACLLRFA1-C messages when there were 3 levels of qualification.

New Release Highlights
Release 3.5
August 1, 2007

The following enhancements are included in this new release of DCD III.

1. When using the DCDJCL feature and also using the ISPF feature to select libraries, concatenated libraries are now processed correctly.

2. In isolated cases where an DB2 'INCLUDE SQLCA' needs to be included to resolve missing data name messages and is not, DCD IIII now removes these warning message from appearing in the DCD III error message reports.

3. An occasional OC7 popping up when including the new 'Unused Data Name Report' added last year, has been fixed.

4. An incorrect error message, associated with the new reports added last year, associated with a table being exceeded, has been corrected.

5. An error in how we process COPY replacing pseudo-text, where the phrase ==(*)== BY ==== is used allows the replaced data-name to slide left backwards into the preceding level number has been fixed.

6. A double qualification problem within one IF similar to the following:

```
IF      FIELD-1  OF  QUAL-FIELD  =  'A'
  OR  FIELD-2  OF  QUAL-FIELD  =  'B'
```

   where some references were lost and/or gave wrong references, has been corrected.

7. The sub-heading in the 'Alternate Compile Listing, labeled 'Literals', has been changed to a more correct label of 'Procedure Division Literals'.

8. When new DDNAME DCDWK08 is missing, an appropriate message is issued, rather than having DCD III issue an abend.

9. A correction was made in the new report showing unreferenced Paragraphs and Sections to include EXEC CICS references to Paragraphs.

1. The user manual now correctly reflects the new DDnames SELECT and BYPASS used for Tracing and Analysis.

11. References in the User's manual to DCD III being compatible with Code Changer software for Field Expansion in Release 3.2, released three years ago have all been removed. Parties interested in Field Expansion software should contact Marble Computer, Inc.

New Release Highlights
Release 3.6
October 1, 2008

The following enhancements are included in this new release of DCD III.

1. A new release of DCD III may now be downloaded from the web rather than obtaining a physical cartridge from Marble Computer.

2. All **600+ Error Messages** produced by DCD III, most dating back to 1989 when DCD III was rewritten into its current format have been rebuilt to a new format making it easier and quicker to identify these messages. Some messages no longer used have been removed. These error messages may be found in the Error Message section of this manual.

3. The entering of the number of **WHOLE-DIGITS** and **DECIMAL-DIGITS** within Tracing and Analysis has been modified to allow either 1 or 2 digits after the operator that follows either keyword mentioned above, rather than always entering 2 digits. This eliminates annoying error messages and simplifies use.

4. SQL processing has been corrected where one type of handling for the **SQL word COUNT** was ignored.

5. Intermittent handling of the **OPTIONAL** clause with COBOL FD SELECTs has been corrected.

6. A correction has been fixed to treat **INCLUDE** members in the same manner as COPY members are treated for the purpose of excluding these data names from showing within the **Unused Data Names report.**

7. A correction has been added to fix a problem where an **AND** following a **WHEN** within an **EVALUATE** statement was incorrectly handled and showed up in the narrative as a subscript for another name.

New Release Highlights
Release 3.7
September 1, 2009

The following enhancements are included in this new release of DCD III.

1. Downloading of the DCD III User's Manual is now available as one download in Adobe Reader rather than by individual sections. As a result, scanning of the manual has been made much easier.

2. The index section of the User's Manual has completely rebuilt to re-calibrate pages, remove irrelevant entries, and include some omissions.

3. Newer software (PDSFETCH) is available for use in place of the much older (MBRFETCH) for accessing MEMBERs on a Partitioned Data Set. Included in this software is the ability to scan for several PREFIXs during only one pass of a PDS (Partitioned Data Set).

4. The handling of COMP-5 usage has been added to DCD III.

5. Flagging of BYPASS Names that do not match a related Data Name within the Tracing and Analysis feature is now done and a PARM option has been added for turning on and off this feature.

6. The JCL reports have been modified to eliminate sometimes duplicate heading lines of < ------- > that separated groupings of PROCNAMEs within JOBNAME.

7. SPF Panels have been corrected in one instance where new DD name DCDWK08 was mislabeled DCDWK07.

8. A problem within the relatively new 'Unused Data Names' Report when using COMPILE mode, where some COPY names were included in this report, (where by design COPY data names should not be included in this report) has been fixed.

New Release Highlights

Release 3.8

March 1, 2011

The following enhancements are included in this new release of DCD III.

1. A previous error allowing CONDITIONAL PERFORMs under a SEARCH / AT END clause to be reported as a NON-CONDITIONAL PERFORM in the Procedure Division Narrative generated has been fixed with this release.

2. A REPORT WRITER problem where the use of the word IS following the word HEADING in and other clauses in a COBOL RDs was not properly handled. Also, when (HEADING IS nnn) is the last clause within the RD an E- level diagnostic was generated. All of these issues with the word IS have been handled in this release.

3. The heading within the Tracing and Analysis report has been changed from 'Found a Name' to 'Tracing and Analysis' report.

4. A fix has been made in independent mode of the Alternate Compile Listing for Pseudo-Text where field-a in the pseudo-text as shown in following line:
   COPY MembName REPLACING ==field-A:== BY ==field-B-==
   ends with a colon (:) but does **not** begin with a colon. This was giving incorrect results in the resolved COPY member. Compile mode did not have this problem.

5. A fix has been made where an IBM FUNCTION immediately followed the INSPECT verb and produced an incorrect error by not syntactically recognizing and bypassing the word FUNCTION and any necessary operands following the word FUNCTION.

6. Other small changes have been made to the User's Manual as internally found or reported by users.

New Release Highlights

Release 4.0

March 1, 2013

This release has two new features resulting in easy PC analysis of COBOL programs as shown below.

- Software on the mainframe side is available to automatically download the 'Alternate Compile Listing' to the PC.
- Software on the PC (**CAT-ACL**) is included to allow PC browsing of the 'Alternate Compile Listing'.

The **DCD IV** release is completely compatible with DCD III.

- Modifications have been added to the software to create one file for easy downloading to the PC.
  - Besides putting the 'Alternate Compile Listing' on this one file, the COBOL program used and each one of the COPY members accessed by the program are **also** downloaded at the tail end of this file in a condensed format.*
  - Extra DD statements are added to the 'Alternate Compile Listing' PROCs to facilitate the downloading of this one file to the PC.
  - Very simple JCL is provided allowing the user to instantly download this file to the PC separately after the mainframe step is executed.

The **CAT-ACL** PC software allows:

- PC browsing of the 'Alternate Compile Listing' with the flexibility and power of the PC under a windows environment.
  - Forward and Backward click buttons make following the program logic easy.
  - Jumping to individual reports or parts of the COBOL program is facilitated with a drop down box.
  - Entering Narrative sequence numbers for branching to the respective home location of the sequence number entered is available.
  - Eliminating the mainframe use of the 80 characters by 24 lines limited mainframe screen to the full view of the PC with attached scroll bar and other CAT-ACL features adds tremendous flexibility to COBOL analysis.

**The COBOL program and COPY members are made available on the PC for users using MARBLE's new CAT (Cool Auditing Tool) for full analysis of COBOL programs including (One View Analysis, Intelligent Editing with project explorer and many added features, Hierarchy Charts, Flowcharts, Forward Tracing married with OR without selected data fields, Backward Tracing, Perform Error reports, one click Data Field Narrative, Open File Tracing and more. Call Marble at 1-800-252-1400 for specific information on CAT.*

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Release 4.0

DCD IV

Alternate Compile Listing

Facility

DCD IV

Alternate Compile Listing Facility

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Use of This Section

This section is designed for everyday use of the Alternate Compile Listing Facility. Topics like, "Introduction to the Alternate Compile Listing Facility", "Overview of Alternate Compile Listing Facility Reports" and others which are designed to be read only once or twice by the programmer are moved to the end of this section, while topics such as "Choice of DCD IV PROCs" and "PARM Options" are moved toward the front of this section.

When using this section for the first time, read the following topics first:

1. Introduction to the Alternate Compile Listing Facility
2. Overview of Alternate Compile Listing Facility Reports
3. Use of DCD IV PARM Options
4. Use of DCD IV PROCs and Symbolics
5. Executing DCD IV When Using a PROC
6. Bringing COBOL to the PC for easy Analysis

These four topics are together within this section. See the Table of Contents.

After reading and reviewing the above topics, continue using this section, starting at the top of the Table of Contents.

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Choice of DCD IV PROCs

Four PROCs are available to choose from when invoking the Alternate Compile Listing Facility. They are:

1. **LIBACL**
2. **PANACL**
3. **COMACL**
4. **DCDACL**

The first and second PROCs are made available for running the Alternate Compile Listing Facility when the source code resides on Librarian or Panvalet files respectively and the user is not using the Compile Mode. (See next paragraph for Compile Mode.) (See "Other Features Supported" for Librarian and Panvalet support.)

The third PROC COMACL is made available for running the Alternate Compile Listing Facility in conjunction with and following the COBOL compile step. The advantage to using this PROC in conjunction with the COBOL compile step is that **one listing** is returned to the COBOL programmer. (See "Compile Mode Considerations" for Compile Mode Support.)

The last PROC DCDACL is made available for running the Alternate Compile Listing Facility when not using one of the above methods. The COBOL source program is provided to the PROC by means of a COBOLIN DD. If COPY members are present within the program *(and a COPYLIB DD is not already provided within the DCDACL PROC)* a COPYLIB DD must be provided to point to the appropriate PDS containing COPY members. This must be the same PDS(s) provided within the SYSLIB DD card within the PROC used to compile the programs. Symbolic parameters may be added to the PROC to override already established defaults. See "Specifying PARM Options" for a list of the symbolic parameters and their uses. The following example is provided:

```
//STEP1    EXEC   DCDACL,UNREF=NO
//DCD.COBOLIN   DD   DSN=USER.PROGRAM.LIB(PROG301) ,DISP=SHR
//DCD.COPYLIB   DD   DSN=USER.COPY.LIB,DISP=SHR
```

More examples are provided under the heading "JCL Examples" in this section. See the Table of Contents.

For a further description on using DCD IV PROCs review the following two headings:

1. **Use of DCD IV PARM Options**
2. **Use of DCD IV PROCs and Symbolics**

Compile Mode Considerations

The Alternate Compile Listing Facility is a stand-alone system, which gives a complete set of reports for the maintenance of COBOL programs. It is not, however, a COBOL compiler. As such, a means is provided, named Compile Mode, in this Alternate Compile Listing Facility for producing one report from the two steps listed here:

1. The COBOL compile step

2. The Alternate Compile Listing Facility Step

Some advantages of using the Compile Mode in the Alternate Compile Listing Facility are listed here:

1. The programmer can have the advantage of using the Alternate Compile Listing Facility every time he or she does a COBOL compile.

2. Extra paper is not generated. The source listing from the COBOL compiler is removed and replaced with one from DCD IV. The DCD IV Condensed Cross Reference Reports are much shorter than the compiler cross-reference listings.

3. Information such as PMAP or DMAP reports or similar information on the source listing produced when using software packages such as the CA-Optimizer or COBOL/Aid is not lost, but is kept and listed appropriately when using Compile Mode. (CA-Optimizer and COBOL/Aid are mentioned under the heading “Other Features Supported”.)

4. The running of the Alternate Compile Listing Facility is usually set to stop and return just the compiler listing if E-level errors are found. This is controlled by the JCL COND parameter within the DCD IV step.

5. The sequence numbers (generated compiler numbers on the Source Listing Report and referenced in other reports) are guaranteed to be the same on all reports merged together, whether from the COBOL compile, the software package like CA-Optimizer, or the Alternate Compile Listing Facility.

Compile Mode requires the following two steps:

1. Run the compile step with modified JCL for the SYSPRINT DD line and do not allow the use of the TITLE statement within the compile step.

2. Run the Alternate Compile Listing Facility with the Compile Mode option turned on.

The SYSPRINT file (printed listing) produced by the COBOL compiler must be saved (not printed) so that it may be read in and pulled apart by the Alternate Compile Listing Facility.

To do this requires a JCL override for the SYSPRINT file when invoking the compile PROC. When other overrides are present, this override must go in sequence so that the SYSPRINT DD within the compile PROC is actually overridden.

The LRECL and BLKSIZE below is set for 133 and 1330. If using a COBOL 74 compiler, before VS COBOL II, unless an option is set with your compiler to produce a LRECL of 133, then substitute 121 and 1210 for LRECL and BLKSIZE. Because of the way the compiler may be set to run at your installation, it is recommended that the SYSPRINT BLKSIZE **not be made initially larger** than 1330 or 1210. If the BLKSIZE is made larger and problems occur, reduce the BLKSIZE before going further.

DISP=MOD must be used as is shown below.

The following is an example of an overriding JCL statement, which must follow the EXEC compile PROC.

```
//COB.SYSPRINT DD  DSN=&&COMPLIST,
//                 DISP=(MOD,PASS),
//                 UNIT=SYSDA,
//                 SPACE=(CYL,(2,2)) ,
//                 DCB=(RECFM=FB,LRECL=133,BLKSIZE=1330)
```

Also, the following should be done when running the Compile step:

1. Ensure that the compiler option NONUM option (not NUM) is in effect. NONUM is normally the default.

2. If the LISTER option is available on your compiler, do not turn that option on when using the Alternate Compile Listing Facility.

3. Observe the rules already mentioned above about using a MOD disposition and initially using a block size of 1330 or 1210.

4. Ensure that the compiler options for printing the data name and procedure name cross references are turned off. This will save paper as DCD IV has Condensed Cross Reference Reports which are one third the size.

Running the Alternate Compile Listing Facility Step

Use the COMACL PROC for Compile Mode. PROC COMACL has the following differences in it from the other PROCs to accommodate Compile Mode:

1. The PARM option COMPILE is turned on in the PARM field of the PROC.
2. The DDNAME INFILE is provided within the PROC and points back to the saved compiler SYSPRINT file.
3. An additional step is added to this PROC for returning the entire compiler listing if one of the following conditions should occur:

    a. The Source Listing Report option in the Alternate Compile Listing Facility is not turned on (e.g. SOURCE=NO).
    b. E-level errors were found in the compiler listing during the compile step. (This is controlled by the COND=parameter.)
    c. The PARM option STOP is used to bypass the running of the Alternate Compile Listing Facility.
    d. The Alternate Compile Listing Facility step abends for any reason.
    e. A trial copy of DCD IV has expired.

4. A COMLCNT= symbolic is provided within the PROC for entering the compiler line count that is used in the compile step.
5. A COND CODE of **0001** is normally returned from the first step in the COMACL PROC (not 0, 4, 8, or 12 as from the other PROCs). The second step is normally **not** executed.

When using the COMACL PROC, the DDNAME COBOLIN is not required, as the COBOL program is taken from the SYSPRINT file via the INFILE DD mentioned earlier.

Most COPYs are automatically resolved during the compile step. However, the COPYLIB DD should always be provided for resolving COPY members where the SUPPRESS clause has been used. Also the SRESOLVE PARM option should be used to indicate that DCD IV should resolve these members. If SRESOLVE is not used, then a COPYLIB DD is not necessary. (However, in doing this the documentation will be incomplete for references made to those fields within the suppressed COPY statement.)

Running the Alternate Compile Listing Facility Step
(Continued)

In the DCD IV step, when reading the SYSPRINT file in and pulling off the COBOL source program from it, DCD IV must also determine when EJECTs are present within the source program, so that the EJECTs are present within the Source Listing Report produced by DCD IV. To consistently do this and not inadvertently miss any, DCD IV needs to know the compiler line count used within the compile step. Sometimes DCD IV can pick this up from the compiler listing provided the compiler *statistics* are printed *before* the COBOL source is printed. To ensure accurate finding of all EJECTs use the COMLCNT= symbolic to enter the compiler line count used within the compile step.

Other Features Supported

This heading provides a list of support for those other features both inside and outside of the standard support for the COBOL compiler that the user may have need for. Those features supported by DCD IV are:

1. BASIS
2. CA-Optimizer
3. CICS
4. COBOL/Aid
5. COBOL 68 and earlier
6. COBOL 74
7. COBOL 85
8. COBOL 370, COBOL for MVS & VM, COBOL 390 & Enterprise COBOL
9. DB2 (SQL)
10. DL1
11. Librarian
12. Panvalet

For DCD IV on the PC, see the heading '**Viewing the Alternate Compile Listing on the PC**' in the Table of Contents of this section.

1. BASIS

BASIS is an IBM Extension, which is a library system for making changes to a COBOL program, which is for the most part infrequently used. If this feature is used in the Compile Mode of DCD IV, nothing needs to be done within DCD IV. When using the DCDACL PROC (not Compile Mode) an additional DD line with the name BASIS will need to be used to input the BASIS lines. The rules that apply for the COBOL compiler when using BASIS apply to DCD IV.

2. CA-Optimizer

The CA-Optimizer is commercial software package widely used. Information from the DMAP and PMAP of the compiler is put alongside the Source Listing Report in the same area that DCD IV narrative is put. To accommodate this situation in DCD IV within Compile Mode, several options are available. They are:

a) Run in Independent Mode. (Do not use Compile Mode.)

b) Use Compile Mode with no special options and all DCD IV narrative will be dropped down one line.

c) Use PARM option CA1, which will move the CA-Optimizer displacement for the Procedure Division into COBOL positions 73-80 on the Source Listing Report. See Exhibit 1 in this section.

d) Use PARM option CA2, which is the same as CA1 except that it also (by means of cut and paste) moves CA-Optimizer information for the Data Division into COBOL positions 73-80 on the Source Listing Report. See both Exhibit 1 and Exhibit 2 in this section.

e) Use PARM option CA3, which will move the CA-Optimizer displacement for the Procedure Division into print positions 128-133. The Data Division CA-Optimizer printed information is left alone.

f) With release 2.1 or greater of DCD IV, omit using CA-Optimizer and let defaulted option PMO, move OFFSETs from the compiler OFFSET map on the Procedure Division listing.

3. **CICS**

CICS is fully supported by DCD IV. Ideally the CICS program should be run through the CICS preprocessor before being brought into DCD IV. When using Compile Mode, the program is run through the preprocessor before the compile step is done. If the preprocessor step is done, both CICS commands and the CALL statements generated by CICS are documented. If the CICS program is not run through the preprocessor, then generated CALL statements are not documented by DCD IV.

4. **COBOL/Aid**

COBOL/Aid is a software package which, like the CA-Optimizer, prints DMAP and PMAP information alongside the Source Listing Report. When this package is used, the PARM option COAID must be used. DCD IV handles COBOL/Aid in the same manner with the options provided for the CA-Optimizer. See the CA-Optimizer within this heading.

5. **COBOL 68 and earlier**

PARM option C68 should be used when processing COBOL 68 programs. The only other special support required for 68 and earlier versions of COBOL is when Compile Mode is used and the compiler is version 3 or earlier (easily determined by the fact that the compiler does not generate compiler line numbers for SKIPs and EJECTs). When this is the case, PARM option VR3 should be included in the PARM field.

6. **COBOL 74**

Use option NOVS2 for COBOL 74.

7. **COBOL 85**

Include PARM option VS2 to indicate the handling of VS COBOL II. Also, when using Compile Mode, use a LRECL of 133 and a corresponding BLKSIZE when providing JCL for the COB.SYSPRINT override.

8. **COBOL 370, COBOL for MVS & VM, COBOL 390, & Enterprise COBOL**

Include PARM option VS2, the same as for COBOL 85. When using the ISPF panels, a separate option is included there for COBOL 370. It is not needed in batch submission.

9. **DB2**

DB2 programs contain SQL statements. Ideally, the DB2 program should run through the DB2 preprocessor before being brought into DCD IV. When using Compile Mode, the program is run through the preprocessor before the compile step is done. If the preprocessor step is done, then the CALL statements generated by SQL are documented. Host variables within the EXEC SQL statements (names that reference into the COBOL program Data Division) are fully documented by DCD IV.

10. **DL1**

DL1 is fully supported by DCD IV. Ideally the DL1 program should be run through the DL1 preprocessor before being brought into DCD IV. When using Compile Mode, the program is run through the preprocessor before the compile step is done. If the preprocessor step is done, both DL1 commands and the CALL statements generated by DL1 are documented. If the DL1 is not run through the preprocessor, then generated CALL statements are not documented by DCD IV.

11. **Librarian**

When INCLUDEs are used (as opposed to COPY statements), they are resolved when the COBOL source code is brought in from Librarian, and therefore are not listed within the COPY Statements Report.

If Compile Mode is used, no other support is required. If Compile Mode is not used, then use the PROC LIBACL which contains a Librarian step ahead of the DCD IV step for pulling the COBOL program off the Librarian Data File. See Example 2 under the heading ‘Examples’ in this section for assistance in using the LIBACL PROC.

12. **Panvalet**

When INCLUDEs are used (as opposed to COPY statements), they are resolved when the COBOL source code is brought in from Panvalet, and therefore not listed within the COPY Statements Report.

If Compile Mode is used, no other support is required. If Compile Mode is not used, then use the PROC PANACL which contains a Panvalet step ahead of the DCD IV step for pulling the COBOL program off of the Panvalet Data File. See Example 3 under the heading ‘Examples’ in this section for assistance in using the PANACL PROC.

```
SQ-NBR  1------6   PROGRAM -ID  DCDLOGIC    01/01/2001    14:56       PAGE   23   73------80   SQ-NBR=S              LOGIC FLOW

108     032200                OR  WK-8-12  IS  EQUAL  TO  'ID  D'                              047
109     032300                    MOVE  '1'  TO  WS-INDENT-SW                    000D90       038
110     032400                    ADD  1  TO  WS-CNT                             000D94       044
111     032500                    GO  TO  B999-EXIT.                             000D9A              COND  GO  TO  112
112     032600  B999-EXIT.                                                       000D9A              COMES  FROM  104,  111
113     032700        EXIT.                                                      000D9A              RETURN  TO  074
114     032800  C-WRITE-READ  SECTION.                                           000DA0              PERFORMED  BY  077
115     032900  C100-WRITE.
116     033000     WRITE  DISK-REC  FROM  WS-WORK-AREA                           000DA4       029  045
117     033100      INVALID KEY DISPLAY 'NO MORE ROOM ON DISK FILE'              000DEA
118     033200      MOVE  '1'  TO  WS-EOF-SW                                     000DFE       040
119     033300      GO  TO  C999-EXIT.                                           000E02              COND  GO  TO  130
120     033400  C200-READ.                                                       000E06
121     033500       READ  TAPE-FILE  INTO  WS-WORK-AREA                         000E06       022  045
122     033600            AT  END
123     033700                 MOVE  '1'  TO  WS-E0F-SW                        000E3A       040
124     033800                 GO  TO  C999-EXIT.                              000E3E              COND  GO  TO  130
125     033900  C300-CHK-FOR-INDENT.                                            000E42
126     034000       IF  WK-8-12  IS  EQUAL  TO  'INDEN'                        -UNCOND-     047
127      034100           OR  WK-8-12  IS  EQUAL  TO  'ID  DI'                              047
128      034200           OR  WK-8-12  IS  EQUAL  TO  'ID   D'                              047
129     034300                GO  TO  C999-EXIT.                              000E56              COND  GO  TO  130
130     034400  C999-EXIT.                                                       000E56              COMES  FROM  119,  124,  129
131     034500        EXIT.                                                      000E56              RETURN  TO  077
```

Exhibit 1

CA1 Report Example

```
SQ-NBR  1------6     PROGRAM -ID  DCDLOGIC    01/01/2001    14:56       PAGE  09     73-------80  # REFERS TO DATA-NAME AT THIS SQ-NBR

 40   012000     05  WS-EOF-SW              PIC X     VALUE '0'.                    BL=4 039   >  MOVE  '1'  TO  #  (118,  123)
 41   012100         88   WS-EOF                     VALUE '1'.                                >  IF  #  (78)
 42   012200     05  WS-CTL-ERROR-SW        PIC X     VALUE '0'.                    BL=4 03A   >  MOVE  '1'  TO  #  (88,  92)
 43   012300         88   WS-CONTROL-ERROR           VALUE '1'.                                >  IF  #  (71)
 44   012400     05  WS-CNT                 PIC S9(3)  COMP-3  VALUE ZERO.          BL=4 03B   >  ADD  1  TO  #  (110)
                                                                                                   IF  #  >  56  (75)
 45   012500 01   WS-WORK-AREA.                                                     BL=4 040   >  READ  TAPE-FILE  @22  INTO  #  (99,  121)
                                                                                                   WRITE  DISK-REC  @29  FROM  #  (116)
 46   012600     05  WK-FILLER              PIC X(7)  VALUE SPACES.                 BL=4 040
 47   012700     05  WK-8-12                PIC X(5)  VALUE SPACES.                 BL=4 047   >  IF  #  =  'INDEN'  (126)  ,  'ID  DI'  (127)  ,
                                                                                                   'D  D'  (128)
 48   012800     05  WK-FILLER-2            PIC X(68)  VALUE SPACES.                BL=4 04C
```

Exhibit 2

CA2 Report Example

Specifying PARM Options

DCD IV is controlled by the use of PARM options included within the PARM field. However, when using DCD IV PROCs to execute the Alternate Compile Listing Facility, the entering of PARM fields is done by means of PROC Symbolics.

This heading lists the PARM options along with a description of the use of each option. Also, in the next heading is a list showing corresponding PROC Symbolics for PARM options.

How these PROC Symbolics are entered into the JCL is shown in many ways in the heading "**Examples**" in this section.

A more detailed explanation on the use of options is found in the two headings:

1. **Use of DCD IV PARM Options**
2. **Use of DCD IV PROCs and Symbolics**

PARM Options

ASKIP
NOASKIP

Account for SKIP1, SKIP2, and SKIP3 lines in the DCD IV Source Listing Report.

BASIS
NOBASIS

This option may be used in Independent Mode of DCD IV to specify the use of BASIS cards to modify the COBOL program. When this option is used, an extra DD (BASIS) is required which contains the IBM format BASIS cards.

CA1

For older CA-Optimizer or COBOL/Aid users. Moves Procedure Division Optimizer information (six-digit displacements, "-UNEXEC-" and "-UNCOND-") into columns 73 through 80 of the Source Listing Report. This allows DCD IV narrative to be placed where CA-Optimizer narrative was. (See CA1 Exhibit in "Other Features Supported".)

CA2

For older CA-Optimizer or COBOL/Aid users. CA2 also automatically invokes CA1. Data Division CA-Optimizer information (base registers and displacements) is moved into columns 73 through 80 of the Source Listing Report, allowing DCDIII narrative to be placed where CA-Optimizer data originally was located. CA-Optimizer input without CA2 in effect causes DCD IV correlation data to be placed on the following line. (See CA2 Exhibit in "Other Features Supported".)

CA3

For older CA-Optimizer or COBOL/Aid users. Moves Procedure Division Optimizer information (six-digit displacement and "-UNEXEC-") into print positions 126-133 of the print line. This allows DCD IV data to be placed where CA-Optimizer information originally was located.

Notes: 1. When using the CA*n* options, only use one (CA1, **or** CA2, **or** CA3
2. For newer CA-Optimizer, optionally user parm option PMO or R3N.

CALL
NOCALL

Produce the CALL Statements Report.

DYCALLS
NODYC

Add Dynamic CALL information to the CALL report.

CHECK
NOCHECK

Used when COMPILE mode is used. This will remove source code where the sequence numbers are lower than previous sequence numbers. This is necessary when running with some older releases of the CA-Optimizer.

CICS

This option is always turned on. However, for CICS COBOL programs, the CICS program should be run through the CICS pre-processor prior to being run through DCD IV.

CLN=nn

Used to specify to DCD IV the same number used in the compiler step in the LINECOUNT= option. This option is only used when COMPILE is used as a DCD IV option. It is not required for VS COBOL II. If it is not specified and VS2 is not used as a DCD IV option, a default will be created which is 3 less than the number used in the LNCNT= PARM field of DCD IV. (This option is used by DCD IV to determine the presence of page EJECTs when reading in the compiler SYSPRINT file.)

COAID NOCOAID	This option indicates to DCD IV that the compiler listing coming into DCD IV was also run through the commercial COBOL/Aid software package. When this option is used, DCD IV options CA1 or CA2 or CA3 may also be used.
COMPILE	This option indicates that the Alternate Compile Listing Facility will be run in COMPILE MODE (i.e., in conjunction with the COBOL compiler). See "**Compile Mode Considerations**" in this section. When not specified the default (INDEP option) will be used.
COF NOCOF	Forces an older compiler standard where COPY statements on the same line with an 01 record with a different 01 record name in the COPY member will use the 01 name within the COPY rather than the 01 record preceding it.
COPY NOCOPY	Produce the COPY Statements Report. For CICS, DL1, or DB2 programs also produce a separate INCLUDE report if INCLUDEs are found.
C68	Use when COBOL 68 is used.
DDC NODDC	Produce the Data Division Condensed Cross Reference Report.
DL1	This option is always turned on. However, for DL1 COBOL programs, the DL1 Programs should be run through the DL1 pre-processor prior to being run through DCD IV.
DNF NODNF	Print a warning message for names not found in the Data Division when resolving Procedure Division statements.
EIB	This option may be used to insert COPY member DFHEIBLK into the COBOL program for cross-referencing CICS names EIBDATE, EIBTIME, and other EIB fields. (Do not use this option if COPY member DFHEIBLK is already brought in, as duplicate names will be created.)
ERRORS NOERRORS	NOERRORS may be used to omit the printing of errors. A summary count of all errors is still provided. This does not affect the return code produced by DCD IV.
FGCONSTS NOFGCONSTS	Produce the Figurative Constants Report.
FTB FTO NOFTO F16	This option is for printing FROM-TO field positions relative to the 01 record that the field belongs to. FTB prints the FROM-TO field positions in columns 73-80 if these columns are not already used. FTO forces the FROM-TO in 73-80 positions. This option will insert the FROM Field position in columns 1 through 6.

HFT	Use HEXADECIMAL rather than DECIMAL FROM-TO positions in 73-80.
IDDLITS NOIDDLITS	Include Data Division Literals in the LITERALS report.
IEJECT NOIEJECT	Ignore EJECT lines when creating the DCD IV Source Listing Report.
INDEP	This option is defaulted to when the COMPILE option is not used. It indicates that DCD IV is not being run in conjunction with the COBOL compiler.
IREFS NOIREFS	This option produces Indirect References showing where verb activity resides In REDEFINES, overlapping field positions and group fields for this field.
IRn (n=1–6)	Use IR1 to IR6 to limit Indirect References to following: IR1 (Indirect Changed), IR2 (Indirect Used), IR3 (Indirect Tested), IR4 (Indirect Changed & Used), IR5 (Indirect Used & Tested), IR6 (Indirect Changed & Tested).
IRN	Force Indirect Narrative even if there is no direct narrative.
IRX	Keep Indirect References in main report, eliminating overflow report.
LITERALS NOLITERALS	Produce the Literals Report.
LNCNT=nnn LNCNT=60	Sets the maximum lines per page for all DCD IV reports. Up to three digits may be Used in specifying LNCNT.
NIS	Re-arrange the SORT sequence of the COBOL narrative produced by DCD into Primary sequence by compiler sequence number rather than a verb name.
NRSPACE NONRSPACE	Inserts a blank line in the Data Division of the Source Listing Report between the last line of narrative for one data name and the next data name line in those cases where the next data name line also has narrative associated with it. Do not use the NRSPACE option if the CA-Optimizer or COBOL/Aid is used.
NUC	Convert all NARRATIVE produced by DCD IV to UPPER Case Characters.
PDC NOPDC	Produce the Procedure Division Condensed Cross Reference Report. If SECTIONs are present, also produce a just SECTIONs report.
PMO NOPMO	Only a valid option when **COM**pile option **is used**, when **R3N** option **is not used** and when the compiler option **OFFSET is used**. This option is only valid for VS COBOL II, release 3 or higher. When used, HEX OFFSETS are taken from the OFFSET map and placed all the way to the right of the source listing.
QUOTE NOQUOTE DETERMINE	Use double quote in place of single apostrophe as the delimiter for alphanumeric literals. The defaulted DETERMINE option allows using the first quote or apostrophe encountered to determine the value of QUOTE or NOQUOTE as a delimiter.
R3N	This is an option for VS COBOL II, Release 3 or later. When used, the PL and SL columns and any narrative from the right side of the compile listing will be carried through to the DCD IV source listing.

RESOLVE NORESOLVE	Expand COPYs encountered in the source program. If COPY members are not resolved numerous warnings may appear for missing data names.
SRESOLVE NOSRESOLVE	Expand COPY ... SUPPRESS statements. Use SRESOLVE if COPY ... SUPPRESS statements are in the code for Compile Mode. Use SRESOLVE in Independent Mode.
SORTREG=nnnnnnn SORTREG=600000	Indicates the SORT region size in bytes. If encountering problems with SORT REGION, increase this amount slightly as needed and ensure that the number in DCB=BUFNO=nn on DCD work files is kept to 5 or smaller. REGION must be more than SORTREG. Keep SORTREG under 1,000,000.
SOURCE NOSOURCE	Print or suppress the Source Listing Report. While running in Compile Mode if NOSOURCE is specified, the compiler source listing is printed.
SPREGS NOSPREGS	Produce the Special Registers Report.
STOP NONSTOP	This option causes DCD IV to immediately stop processing and issue a Condition Code of zero. If used in Compile Mode, the COBOL SYSPRINT file will be printed out. (A small amount of Initiator CPU time is invoked when this option is used.)
U01 NOU01 UNUSED	Produce a report at the end of the Alternate Compile Listing showing all unused 01records. See Heading 'Unused 01 Records and Unused Data Names'. Use option UNU to turn off all three unused reports (U01,UDN,UPARAS).
UDN NOUDN UNUSED	Produce a report at the end of the Alternate Compile Listing showing all unused data names. See Heading 'Unused 01 Records and Unused Data Names'. Use option UNU to turn off all three unused reports (U01,UDN,UPARAS). This report will be turned off, if there are no data names or if NOIREF is specified.
UPARAS NOUPARAS UPIGNORE NOUPIGNORE UNUSED	Produce a report at the end of the Alternate Compile Listing showing all unused Paragraphs & Sections. See Heading 'Unused Paragraph and Section Names'. The default UPI option IGNORES reporting unused Paragraphs or Sections that are in the range of a PERFORM or PERFORM THRU. Use NOUPI to report these routines as unused. Use option UNU to turn off all three unused reports (U01,UDN,UPARAS).
UNREF NOUNREF	Print or suppress un-referenced data names and paragraph names in the Data Division and Procedure Division Condensed Cross Reference Reports.
VERB NOVERB	Produce Condensed VERB Report.
VR3 NOVR3	Emulate 1974 Version 3 COBOL (and earlier versions), in which compiler line numbers are not generated for SKIPs and EJECTs. For use in Compile Mode.
VS2 NOVS2	Use NOVS2 for COBOL older program prior to the 1985 COBOL standard.

Corresponding PROC Symbolics

PARM Option	Corresponding PROC Symbolic
ASKIP	**default**
NOASKIP	**OTHER='NOASK,'**
BASIS	**OTHER='BAS,'**
NOBASIS	**default**
CA1	**OTHER='CA1,'**
CA2	**OTHER='CA2,'**
CA3	**OTHER='CA3,'**
CALL	**CALL=**
NOCALL	**CALL=NO,**
DYCALLS	**default**
NODYCALLS	**OTHER='NODYC,'**
CHECK	**default**
NOCHECK	**OTHER='NOCHE.'**
CICS	**always on**
CLN=nnn	**COMLCNT=nnn,**
COAID	**OTHER='COA,'**
NOCOAID	**default**
COMPILE	**default in PROC COMACL**
COPY	**COPY=**
NOCOPY	**COPY=NO,**
C68	**OTHER='C68,'**
DDC	**CDATADV=,**
NODCC	**CDATADV=NO,**
DL1	**always on**
DNF	**default**
NODNF	**OTHER='NODNF,'**
EIB	**OTHER='EIB,'**
ERRORS	**default**
NOERRORS	**OTHER='NOERR,'**
FGCONSTS	**FIGCON=,**
NOFGCONSTS	**FIGCON=NO,**
FTB	**default**
FTO	**OTHER='FTO,'**
NOFTO	**OTHER='NOFTO,'**
HFT	**OTHER='HFT,'**
IDDLITS	**OTHER='IDD,'**
NOIDDLITS	**default**
IEJECT	**OTHER='IEJ,'**
NOIEJECT	**default**

PARM Option	Corresponding PROC Symbolic
INDEP	**default unless PROC COMACL is used.**
IREFS	**default**
NOIREFS	**OTHER='NOIRE,'**
IR1 – IR6	**OTHER='IRn,' n=1-6**
IRN	**OTHER='IRN,'**
IRX	**OTHER='IRX,'**
LNCNT=nnn	**LINECNT=nnn,**
NIS	**OTHER='NIS,'**
NUC	**OTHER='NUC,'**
NRSPACE	**OTHER='NRS,'**
PDC	**CPROCDV=,**
NOPDC	**CPROCDV=NO,**
PMO	**default**
NOPMO	**OTHER='NOPMO,'**
QUOTE	**OTHER='QUO,'**
NOQUOTE	**default**
DETERMINE	**OTHER='DET,'**
R3N	**OTHER='R3N,'**
RESOLVE	**RESOLVE=,**
NORESOLVE	**RESOLVE=NO,**
SRESOLVE	**default**
NORESOLVE	**OTHER='NOSRE,'**
SORTREG=n	**SORTREG=nnnnnnn,**
SOURCE	**SOURCE=,**
NOSOURCE	**SPREGS=NO,**
SPREGS	**default**
NOSPREGS	**SPREGS=NO,**
STOP	**OTHER='STOP,'**
UNREF	**UNREF=,**
NOUNREF	**UNREF=NO,**
U01,UDN,UPA,UPI	**default**
UNUSED	**OTHER='NOUNU,'**
NOU01	**OTHER='NOU01,'**
NOUPI	**OTHER='NOUPI,'**
VERB	**default**
NOVERB	**OTHER='NOVER,'**
VR3	**OTHER='VR3,'**
NOVR3	**default**
VS2	**default**
NOVS2	**OTHER='NOVS2,'**

Note: The PROC symbolic **OTHER** is used to enter PARM options for which there are no corresponding symbolics. When multiple PARM options are entered they are separated by commas. (e.g. - **OTHER='CA3,NOASK,NOVS2'**)

Viewing the Alternate Compile Listing on the PC

To view the 'Alternate Compile Listing' on the PC, this report must be transferred to an appropriate server or directly to the PC via an FTP step for access by Marble software (CAT-ACL).

Then simply executing CAT-ACL will bring up this Alternate Compile Listing for viewing on the PC with the power of PC with windows flexibility available for the COBOL technician. If CAT-ACL is not installed on your PC, see our website www.marblecomputer.com or ask for internal assistance on getting this software installed.

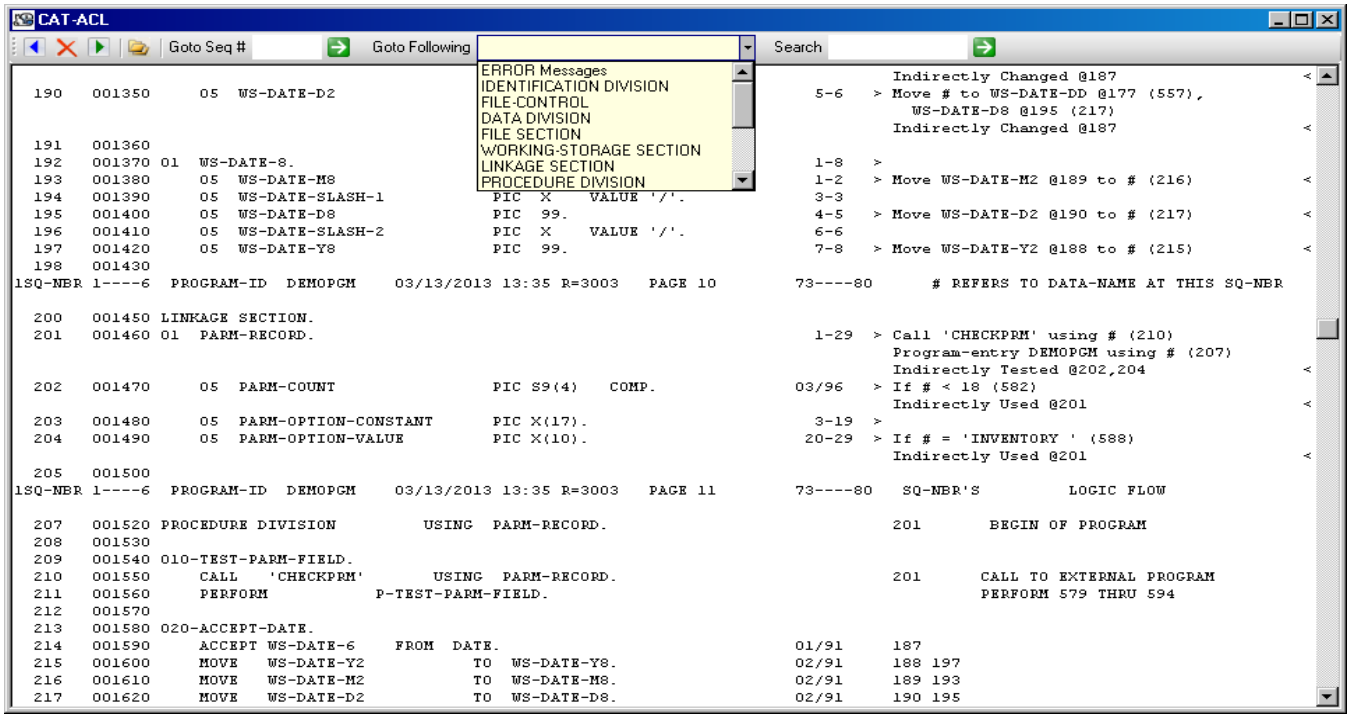

Exhibit 3
CAT-ACL Example

JCL to FTP the 'Alternate Compile Listing' File to the PC

Append the following JCL within the DCD step on the mainframe that creates an Alternate Compile Listing within executed PROC (COMACL, DCDACL, LIBACL, or PANACL).

```
//DCD.PCTEMPFL DD DSN=userid.FILE2PC,DISP=SHR
//FTP2PC  EXEC  PGM=FTP,PARM='(EXIT=8',REGION=2048K
//OUTPUT    DD    SYSOUT=*
//INPUT     DD    DSN=userid.FTPSTMTS,DISP=SHR
```

Notes:

1. 'userid' used twice above needs to replaced with the user's id. See NOTIFY= in Job card.
2. Before using this JCL for the first time, both files used above (userid.FILE2PC and userid.FTPSTMTS must be created & catalogued by the user. See the next page.
3. The file names FILE2PC and FTPSTMTS may be changed by the user if needed.
4. Do not use Marble ISPF panels to run the 'Alternate Compile Listing'. This step may not be appended after the DCD step, when using Marble ISPF panels to execute DCD.

First Time JCL (to create files FILE2PC and FTPSTMTS)

File FILE2PC

File userid.FILE2PC is used to hold the special 'Alternate Compile Listing' to PC file in a catalogued data set so that is can be downloaded by FTP to the PC. Once this data set is catalogued one time on an individual's userid, everything is set for continued use.

Go to the 'Data Set Utility', e.g. =3.2 within ISPF, and Allocate and Catalog a file name in the format 'userid.FILE2PC' where userid is replaced with the user's userid.

When allocating the file, use the following attributes:

Volume serial	= `(fill in)`
Space units	= CYLINDER
Primary quantity	= 1
Secondary quantity	= 2
Directory Blocks	= 0 (for sequential data set)
Record format	= FB
Record Length	= 133
Block Size	= 13300

Insure the file is catalogued when done.

File FTPSTMTS

File userid.FTPSTMTS is used to hold FTP control statements for correctly transferring the COBOL mainframe file to the PC. Once the data set is allocated, catalogued and then control statements are entered to direct FTP, the file should rarely need modification.

Go to the 'Data Set Utility', e.g. =3.2 within ISPF, and Allocate and Catalog a file name in the format 'userid.FTPSTMTS' where userid is replaced with the user's userid.

When allocating the file, use the following attributes:

Volume serial	= `(fill in)`
Space units	= TRACK
Primary quantity	= 1
Secondary quantity	= 1
Directory Blocks	= 0 (for sequential data set)
Record format	= FB
Record Length	= 80
Block Size	= 800

Insure the file is catalogued when done.

See **Entering FTP Commands** on the next page.

Entering FTP Commands

Now that the file is catalogued, go into the edit panel (e.g. =2), with the specified file name, and enter appropriate FTP commands to allow FTP to succeed in transferring the COBOL file to the PC.

Before entering control statements, enter the **'NUMBER OFF'** command on the editor command line. After this is done enter five lines as follows:

```
nnn.nnn.nnn.nnn        (Enter IP address here)
userid password        (Enter userid and password with one space between them)
CD ./PCDCDC/TRANSFER/IN
PUT 'userid.FILE2PC' File2PC.txt
QUIT
```

If you do not have an ***IP address*** or if there are in-house policies or directions on using FTP, consult either in-house memo's or get directions from the person responsible for using FTP in-house.

After entering commands, do the following:

1. Do an initial SAVE before proofing. The reason for initial SAVE is explained just below.
2. Insure there are blanks at the end of each line all the way through column 80 by using the F11 function key. Warning- Sometimes hitting the wrong function will exit from editor without saving entered commands, hence the need above for an initial SAVE.
3. If there are line numbers in columns 73-80, again make sure NUMBER OFF is in effect and then wipe out columns 73-80 in the editor replacing them with spaces.
4. Save file and check one more time with F11 to insure nothing is in columns 73-80.

WARNING on columns 73-80

*FTP does not work if there are numbers embedded in columns 73-80 of the control file and when control statements are entered without NUMBER OFF being specified, these numbers **are not** viewed by the user unless Function F11 is used to be able to see them. Then when running FTP, if they are present, FTP fails to run **without** specifying a clean message as to why and the user may waste a large amount of time determining why. This may result in an hour or two of wasted time in determining why.*

For this reason, along with others, control statements are entered in a separate file. By placing these statements within a separate file that is not often modified, this reduces the chance of user error in daily use of JCL used to execute DCD.

Downloading CAT-ACL

The downloaded software CAT-ACL has been provided to your company during installation and made available for residing on a company server or to each individual PC.

If the software CAT-ACL is loaded to a company server, the user will need in-house advice on how to access.

JCL Examples

All the examples within this section use one of four DCD IV PROCs. These four PROCs are:

1. COMACL - Compile Mode
2. DCDACL - Independent Mode
3. LIBACL - Independent Mode for Librarian
4. PANACL - Independent Mode for Panvalet

For an example for using DCD IV reports on the PC, see the previous heading in this section, '**Viewing the Alternate Compile Listing on the PC'.**

These examples all assume that the PROCs have been set to print all of the reports available within the Alternate Compile Listing Facility. The first ACLF report (the SOURCE listing) accounts for 85% or more of the paper generated. The remaining reports take less than 15% in paper size.

Within each of the examples, capitalized letters should be left coded as they are shown and non-capitalized letters require the user to enter in the names or entries required to complete the JCL.

Example 1

Print all of the Alternate Compile Listing Facility Reports. The input COBOL program is stored on a partitioned data set. The COBOL program does contain COPY statements. DCD IV is going to be run in Independent Mode.

```
//step   EXEC    DCDACL
//DCD.COBOLIN   DD    DSN=user.source(progname),DISP=SHR
//DCD.COPYLIB   DD    DSN=user.copylib,DISP=SHR
```

Example 2

Print all of the Alternate Compile Listing Facility Reports. Do not print unreferenced names within the Condensed Cross Reference Reports. The Input COBOL program is stored on a Librarian Data Set. The COBOL program also contains COPY statements. DCD IV is going to be run in Independent Mode for Librarian.

```
//step  EXEC  LIBACL,UNREF=NO,SRCLIB='librarian.dsn'
//LIB.SYSIN   DD    *
-OPT  EXEC
-SEL   progname,pswd
-EMOD
-END
/*
//DCD.COPYLIB     DD     DSN=user.copylib,DISP=SHR
```

Example 3

Print all of the Alternate Compile Listing Facility Reports with the exception of the Data Division Condensed Cross Reference Report. The input COBOL program is stored on a Panvalet Data Set. The COBOL program does not contain COPY statements. (If any COPY statements are found, DCD IV is told not to resolve them.) DCD IV is going to be run in Independent Mode for Panvalet.

```
//step   EXEC   PANACL,CDATADV=NO,RESOLVE=NO,
//SRCLIB='panvalet.dsn'
//PAN.SYSIN  DD    *
++WRITE WORK,progname
/*
```

Example 4

Print The Source Listing Report. Do not print any of the other reports. There are no COPY statements. DCD IV is going to be run in Independent Mode. The input COBOL program is stored on a sequential file.

```
//STEP     EXEC   DCDACL,CALL=NO,COPY=NO,FIGCON=NO,
//          LITERAL=NO,SPREGS=NO,CDATADV=NO,CPROCDV=NO,OTHER='UNU,NOVER'
//DCD.COBOLIN   DD   DSN=sequential.file.UNIT=disk,
//          VOL=SER=volser,DISP=(OLD,KEEP)
```

Example 5

Print all of the Alternate Compile Listing Facility Reports. Run DCD IV in Compile Mode.

```
//step    EXEC   COBUL,...     (or other compile PROC name)
//COB.SYSPRINT DD   DSN=&&COMPLIST,
//                  DISP=(MOD,PASS),UNIT=SYSDA,
//                  SPACE=(CYL,(1,2)),
//                  DCB=(RECFM=FB,LRECL=133,BLKSIZE=1330)
//COB.SYSINDD   DSN=user.pds (cobolpgm) ,DISP=SHR
//step    EXEC   COMACL
```

Example 6

Do not print the Data Division and Procedure Division Condensed Cross Reference Reports. Run DCD IV in Compile Mode. COPY statements using the SUPPRESS clause may be present. If they are found, DCD IV will override the SUPPRESS clause and expand the COPY clause.

```
//step       EXEC   COBUCL,...   (or other compile PROC name)
//COB.SYSPRINT DD   DSN=&&COMPLIST,
//                  DISP=(MOD,PASS),UNIT=SYSDA,
//                  SPACE=(CYL,(1,2)),
//                  DCB=(RECFM=FB,LRECL=121,BLKSIZE=1210)
//COB.SYSINDD   DSN=user.pds(cobolpgm),DISP=SHR
//step       EXEC   COMACL,CDATADV=NO,CPROCDV=NO,
//                  OTHER=SRE
//DCD.COPYLIB   DD   DSN=user.copylib,DISP=SHR
```

JCL to Execute DCD IV Without Using PROCs

The JCL necessary to execute the Alternate Compile Listing Facility is listed here and is informational. It is recommended however, that PROCs be used for the actual execution of DCD IV. The rest of this manual is designed for the use of one of the four PROCs provided.

```
//DCD          EXEC   PGM=DCDMAIN,REGION=6144K,
//    PARM=(options)
//*
//STEPLIB      DD  DSN=user.loadlib,DISP=SHR
//CLEANUP      DD  DUMMY,DCB=(LRECL=80,BLKSIZE=3120)
//CONTROL      DD  DSN=user.pds(DCDCNTRL),DISP=SHR
//*
//DCDWK01      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK02      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK03      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK04      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK05      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK06      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK07      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK08      DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//*
//PCTEMPFL     DD   DSN=&&SEND2PC,UNIT=&WORK,SPACE=(CYL,(2,2)),
//                  DCB=(BUFNO=&BUF,RECFM=FB,LRECL=133,BLKSIZE=13300),DISP=(,PASS)
//PCWKCOPY     DD   UNIT=&WORK,SPACE=(CYL,(2,2)),
//                  DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=3120)
//PCWORK01     DD   UNIT=&WORK,SPACE=(CYL,(2,2)),
//                  DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PCWORK02     DD   UNIT=&WORK,SPACE=(CYL,(2,2)),
//                  DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PRINT        DD   SYSOUT=*,DCB=BLKSIZE=133
//*
//SYSOUT       DD  DUMMY=*,DCB=BLKSIZE=121
//SORTMESS     DD  DUMMY=*,DCB=BLKSIZE=133
//SORTLIB      DD  DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01     DD  UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK02     DD  UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK03     DD  UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//*
```

See the next page for possible additional DD cards.

Extra DD statements listed here may be required*:*

BASIS - only required if IBM's BASIS is used. See "Other Features Supported". Also, use the BASIS parm option.

COBOLIN - required if Independent Mode is used. Points to the COBOL program. See "Examples" for use of this DD.

COPYLIB - required in Independent Mode if COPY statements are present. Required in Compile Mode if COPY statements with the SUPPRESS clause are used and the SRESOLVE option is used. Must point to the PDS where the COPY members are kept. This must be the same PDS(s) pointed to in the SYSLIB statement used by the COBOL compiler.

INFILE - required if Compile Mode is used. Points to the SYSPRINT file saved from the compile step. See the COMACL PROC for an example of this DD.

PRTCMPLR - required if Compile Mode is used. This is a SYSOUT= file and contains the compiler SYSPRINT file without the compiler source listing. See the COMACL PROC for an example of this DD.

The REGION is set to 6144K. To make smaller, consult the Installation Instructions for guidelines on REGION size.

The DCB=BUFNO is set to 5 for MVS. If increasing, increase REGION size.

See Installation Instructions for information on the CONTROL DD.

PROCs Provided With the DCD IV System

Four PROCs are provided. They are listed here and are shown on the next four pages. Not all of these may be installed on your system.

See the heading "Examples" for examples of using these PROCs.

1. **COMACL** - Compile Mode
2. **DCDACL** - Independent Mode
3. **LIBACL** - Independent Mode for Librarian
4. **PANACL** - Independent Mode for Panvalet

```
//COMACL PROC SOURCE=,  * PRODUCE   SOURCE                    REPORT
//           CALL=,     * PRODUCE   CALL                      REPORT
//           COPY=,     * PRODUCE   COPY                      REPORT
//           FIGCON=,   * PRODUCE   FIGURATIVE CONSTANT       REPORT
//           LITERAL=,  * PRODUCE   LITERAL                   REPORT
//           SPREGS=,   * PRODUCE   SPECIAL REGISTER          REPORT
//           CDATADV=,  * PRODUCE   CONDENSED DATA DIV        REPORT
//           CPROCDV=,  * PRODUCE   CONDENSED PROC DIV        REPORT
//           RESOLVE=,  * RESOLVE   COPY MEMBERS WHEN FOUND
//           UNREF=,    * INCLUDE   UNREF NAMES IN CROSS REFERENCE
//*    USE    XXXX =NO   ABOVE TO TURN OFF (E.G. COPY=NO TO OMIT COPY REPORT)
//           OTHER=‘,’,  * USED TO ENTER OTHER PARM OPTIONS
//           COMLCNT=00, * COMPILER LINE COUNT FROM LAST STEP
//           LINECNT=60, * NUMBER OF LINES TO PRINT PER PAGE
//           BUF=5,      * USE BUF=5
//           PRINT=‘*’,  * SEND PRINTER OUTPUT TO MSGCLASS
//           REG=6144K,  * REGION SIZE
//           SORTREG=600000, * MAKE 600000 MINIMUM AVAILABLE TO SORT
//           WORK=SYSDA  * UNIT=SYSDA,DISK OR OTHER
//*    PROC TO RUN THE ‘ALTERNATE COMPILE LISTING’ FACILITY OF DCD IV
//*          IN COMPILE MODE
//*    MARBLE COMPUTER, INC.  1-800-252-1400  PROC=COMACL  RELEASE 4.0
//*                                                          LM090112
//DCD      EXEC PGM=DCDMAIN,REGION=&REG,
//         PARM=(&SOURCE.SOU,&CALL.CAL,&COPY.COP,&FIGCON.FGC,
//           &LITERAL.LIT,&SPREGS.SPR,&CDATADV.DDC,&CPROCDV.PDC,
//           COM,‘CLN=&COMLCNT’,
//           &RESOLVE.RES,&UNREF.UNR,&OTHER,
//          ‘SOR=&SORTREG’,‘LNC=&LINECNT’)
//*    INSERT STEPLIB HERE IF NECESSARY
//CLEANUP     DD  DUMMY,DCB=(LRECL=80,BLKSIZE=3120)
//CONTROL     DD  DSN=USER.PDS(DCDCNTRL),DISP=SHR
//*   INSERT COPYLIB HERE IF NECESSARY
//DCDWK01     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK02     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK03     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK04     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK05     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK06     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK07     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK08     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//PCTEMPFL    DD  DSN=&&SEND2PC,UNIT=&WORK,SPACE=(CYL,(2,2)),
//         DCB=(BUFNO=&BUF,RECFM=FB,LRECL=133,BLKSIZE=13300),DISP=(,PASS)
//PCWKCOPY    DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//         DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=3120)
//PCWORK01    DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//         DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PCWORK02    DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//         DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//INFILE      DD  DSN=&&COMPLIST,DISP=(OLD,PASS)
//PRINT       DD  SYSOUT=&PRINT,DCB=BLKSIZE=133
//PRTCMPLR    DD  SYSOUT=&PRINT,DCB=BLKSIZE=133
//SORTLIB     DD  DSN=SYS1.SORTLIB,DISP=SHR
//SORTMESS    DD  DUMMY,DCB=BLKSIZE=133
//SORTWK01    DD  UNIT=&WORK,SPACE= (TRK, (100),,CONTIG)
//SORTWK02    DD  UNIT=&WORK,SPACE= (TRK, (100),,CONTIG)
//SORTWK03    DD  UNIT=&WORK,SPACE= (TRK, (100),,CONTIG)
//SYSOUT      DD  DUMMY,DCB=BLKSIZE=121
//*
//RETCMPLR  EXEC PGM=GIVEBACK,COND=((1,EQ,DCD),EVEN)
//*          GIVEBACK IS EXECUTED WHEN:
//*            1. THE SOURCE LISTING IS NOT PRINTED
//*            2. THE DCD STEP IS NOT RUN
//INFILE      DD  DSN=&&COMPLIST,DISP=(OLD,DELETE)
//PRTFILE     DD  SYSOUT=&PRINT,DCB=BLKSIZE=133
```

Exhibit 4
Compile Mode PROC – COMACL

```
//DCDACL  PROC  SOURCE=,          *  PRODUCE  SOURCE                    REPORT
//              CALL=,            *  PRODUCE  CALL                      REPORT
//              COPY=,            *  PRODUCE  COPY                      REPORT
//              FIGCON=,          *  PRODUCE  FIGURATIVE CONSTANT       REPORT
//              LITERAL=,         *  PRODUCE  LITERAL                   REPORT
//              SPREGS=,          *  PRODUCE  SPECIAL REGISTER          REPORT
//              CDATADV=,         *  PRODUCE  CONDENSED DATA DIV        REPORT
//              CPROCDV=,         *  PRODUCE  CONDENSED PROC DIV        REPORT
//*
//              RESOLVE=,          *  RESOLVE  COPY MEMBERS WHEN FOUND
//              UNREF=,            *  INCLUDE  UNREF NAMES IN CROSS REFERENCE
//*  USE XXXX=NO ABOVE TO TURN OFF (E.G. COPY=NO TO OMIT COPY REPORT)
//*
//              OTHER=',',         *  USED TO ENTER OTHER PARM OPTIONS
//              LINECNT=60,        *  NUMBER OF LINES TO PRINT PER PAGE
//              BUF=5,             *  USE BUF=5
//              PRINT='*',         *  SENT PRINTER OUTPUT TO MSGCLASS
//              REG=6144K,         *  REGION SIZE
//              SORTREG=600000, *  MAKE 600000 MINIMUM AVAILABLE TO SORT
//              WORK=SYSDA         *  UNIT=SYSDA, DISK OR OTHER
//*   PROC TO RUN THE 'ALTERNATE COMPILE LISTING' FACILITY OF DCD IV
//*       BY ITSELF, WITHOUT MAKING REFERENCE TO THE COBOL COMPILER
//*
//*   MARBLE COMPUTER, INC.     1-800-252-1400     PROC=DCDACL       RELEASE  4.0
//*                                                                      LM090112
//DCD   EXEC  PGM=DCDMAIN,REGION=&REG,
//          PARM=(&SOURCE.SOU,&CALL.CAL,&COPY.COP,&FIGCON.FGC,
//            &LITERAL.LIT,&SPREGS.SPR,&CDATADV.DDC,&CPROCDV.PDC,
//            &RESOLVE.RES,&UNREF.UNR,&OTHER,
//            'SOR=&SORTREG','LNC=&LINECNT')
//*
//*   INSERT  STEPLIB  HERE  IF  NECESSARY
//*
//CLEANUP   DD     DUMMY,DCB=(LRECL=80,BLKSIZE=3120)
//CONTROL   DD     DSN=USER.PDS (DCDCNTRL ) , DISP=SHR
//*
//*   INSERT  COPYLIB  HERE  IF  NECESSARY
//*
//DCDWK01   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK02   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK03   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK04   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK05   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK06   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK07   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK08   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//*
//PCTEMPFL  DD  DSN=&&SEND2PC,UNIT=&WORK,SPACE=(CYL,(2,2)),
//          DCB=(BUFNO=&BUF,RECFM=FB,LRECL=133,BLKSIZE=13300),DISP=(,PASS)
//PCWKCOPY  DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//          DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=3120)
//PCWORK01  DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//          DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PCWORK02  DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//          DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//*
//PRINT     DD  SYSOUT=&PRINT,DCB=BLKSIZE=133
//*
//SORTLIB   DD  DSN=SYS1.SORTLIB,DISP=SHR
//SORTMESS  DD  DUMMY,DCB=BLKSIZE=133
//SORTWK01  DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK02  DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK03  DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SYSOUT    DD  DUMMY,DCB=BLKSIZE=121
```

Exhibit 5
Independent Mode PROC - DCDACL

```
//LIBACL PROC  SOURCE=,          *  PRODUCE  SOURCE                  REPORT
//             CALL=,            *  PRODUCE  CALL                    REPORT
//             COPY=,            *  PRODUCE  COPY                    REPORT
//             FIGCON=,          *  PRODUCE  FIGURATIVE CONSTANT     REPORT
//             LITERAL=,         *  PRODUCE  LITERAL                 REPORT
//             SPREGS=,          *  PRODUCE  SPECIAL REGISTER        REPORT
//             CDATADV=,         *  PRODUCE  CONDENSED DATA DIV      REPORT
//             CPROCDV=,         *  PRODUCE  CONDENSED PROC DIV      REPORT
//             RESOLVE=,         *  RESOLVE COPY MEMBERS WHEN FOUND
//             UNREF=,           *  INCLUDE UNREF NAMES IN CROSS REFERENCE
//*  USE XXXX=NO  ABOVE TO TURN OFF (E.G. COPY=NO TO OMIT COPY REPORT)
//             OTHER=',',        *  USED TO ENTER OTHER PARM OPTIONS
//             LINECNT=60,       *  NUMBER OF LINES TO PRINT PER PAGE
//             SRCLIB='LIBRARAN.SOURCE',  *  NAME OF LIBRARIAN FILE
//             LIBPGM=LIBRARAN,           *  EXECUTABLE MEMBER NAME ON LOAD LIB
//             BUF=5,            *  USE BUF=5
//             PRINT='*',        *  SEND PRINTER OUTPUT TO MSGCLASS
//             REG=6144K,        *  REGION SIZE
//             SORTREG=600000,   *  MAKE 600000 MINIMUM AVAILABLE TO SORT
//             WORK=SYSDA        *  UNIT=SYSDA, DISK OR OTHER
//*  PROC       TO RUN 'ALTERNATE COMPILE LISTING' FACILITY OF DCD IV
//*             WITH LIBRARIAN AND NOT WITH THE COBOL COMPILER
//*    MARBLE COMPUTER, INC.  1-800-252-1400  PROC=LIBACL  RELEASE 4.0
//*                                                          LM090112
//LIB    EXEC  PGM=&LIBPGM,PARM='NJTA,NRJS'  ** CHECK LIBRARIAN PARMS
//*  INSERT STEPLIB HERE IF NECESSARY
//SYSPRINT    DD  SYSOUT=&PRINT
//LIST        DD  SYSOUT=&PRINT
//MASTER      DD  DSN=&SRCLIB,DISP=SHR
//OSJOB       DD  DSN=&&TEMP,DCB=BLKSIZE=6160,UNIT=&WORK,
//              DISP=(,PASS),SPACE=(CYL,(2,2))
//DCD   EXEC  PGM=DCDMAIN,REGION=&REG,
//          PARM=(&SOURCE.SOU,&CALL.CAL,&COPY.COP,&FIGCON.FGC,
//            &LITERAL.LIT,&SPREGS.SPR,&CDATADV.DDC,&CPROCDV.PDC,
//            &RESOLVE.RES,&UNREF.UNR,&OTHER,
//           'SOR=&SORTREG','LNC=&LINECNT')
//*  INSERT STEPLIB HERE IF NECESSARY
//COBOLIN     DD  DSN=&&TEMP,DISP=(OLD,DELETE)
//CLEANUP     DD  DUMMY,DCB=(LRECL=80,BLKSIZE=3120)
//CONTROL     DD  DSN=USER.PDS(DCDCNTRL),DISP=SHR
//*  INSERT COPYLIB HERE IF NECESSARY
//DCDWK01     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK02     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK03     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK04     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK05     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK06     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK07     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK08     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//PCTEMPFL    DD  DSN=&&SEND2PC,UNIT=&WORK,SPACE=(CYL,(2,2)),
//              DCB=(BUFNO=&BUF,RECFM=FB,LRECL=133,BLKSIZE=13300),DISP=(,PASS)
//PCWKCOPY    DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//              DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=3120)
//PCWORK01    DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//              DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PCWORK02    DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//              DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PRINT       DD  SYSOUT=&PRINT,DCB=BLKSIZE=133
//SORTLIB     DD  DSN=SYS1.SORTLIB,DISP=SHR
//SORTMESS    DD  DUMMY,DCB=BLKSIZE=133
//SORTWK01    DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK02    DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK03    DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SYSOUT      DD  DUMMY,DCB=BLKSIZE=121
```

Exhibit 6
Librarian Independent Mode PROC – LIBACL

```
//PANACL PROC  SOURCE=,          *  PROCUCE   SOURCE                  REPORT
//            CALL=,            *  PRODUCE   CALL                    REPORT
//            COPY=,            *  PRODUCE   COPY                    REPORT
//            FIGCON=,          *  PRODUCE   FIGURATIVE CONSTANT     REPORT
//            LITERAL=,         *  PRODUCE   LITERAL                 REPORT
//            SPREGS=,          *  PRODUCE   SPECIAL REGISTER        REPORT
//            CDATADV=,         *  PRODUCE   CONDENSED DATA DIV      REPORT
//            CPROCDV=,         *  PRODUCE   CONDENSED PROC DIV      REPORT
//            RESOLVE=,         *  RESOLVE COPY MEMBERS WHEN FOUND
//            UNREF=,           *  INCLUDE UNREF NAMES IN CROSS REFERENCE
//*  USE XXXX=NO ABOVE TO TURN OFF (E.G. COPY=NO TO OMIT COPY REPORT)
//            OTHER=',',        *  USED TO ENTER OTHER PARM OPTIONS
//            LINECNT=60,       *  NUMBER OF LINES TO PRINT PER PAGE
//            SRCLIB='PANVALET.SOURCE', *  NAME OF PANVALET FILE
//            BUF=5,            *  USE BUF=5
//            PRINT='*',        *  SEND PRINTER OUTPUT TO MSGCLASS
//            REG=6144K,        *  REGION SIZE
//            SORTREG=600000,   *  MAKE 600000 MINIMUM AVAILABLE TO SORT
//            WORK=SYSDA        *  UNIT=SYSDA, DISK OR OTHER
//*  PROC TO RUN THE 'ALTERNATE COMPILE LISTING' FACILITY OF DCD IV
//*          WITH PANVALET AND NOT WITH THE COBOL COMPILER
//*    MARBLE COMPUTER, INC.    1-800-252-1400    PROC=PANACL    RELEASE 4.0
//*                                                                LM090112
//PAN  EXEC  PGM=PAN#1,
//*  INSERT  STEPLIB  HERE  IF  NECESSARY
//SYSPRINT   DD  SYSOUT=&PRINT
//PANDD1     DD  DSN=&SRCLIB,DISP=SHR
//PANDD2     DD DSN=&&TEMP,DCB=BLKSIZE=6160,UNIT=&WORK,
//              DISP=(,PASS),SPACE=(CYL,(2,2))
//DCD  EXEC  PGM=DCDMAIN,REGION=&REG,
//         PARM=(&SOURCE.SOU,&CALL.CAL,&COPY.COP,&FIGCON.FGC,
//           &LITERAL.LIT,&SPREGS.SPR,&CDATADV.DDC,&CPROCDV.PDC,
//           &RESOLVE.RES,&UNREF.UNR,&OTHER,
//           'SOR=&SORTREG','LNC=&LINECNT')
//*  INSERT  STEPLIB  HERE  IF  NECESSARY
//COBOLIN    DD   DSN=&&TEMP,DISP=(OLD,DELETE)
//CLEANUP    DD   DUMMY,DCB=(LRECL=80,BLKSIZE=3120)
//CONTROL    DD   DSN=USER.PDS(DCDCNTRL),DISP=SHR
//*  INSERT   COPYLIB  HERE  IF  NECESSARY
//DCDWK01    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK02    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK03    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK04    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK05    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK06    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK07    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK08    DD   UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//PCTEMPFL   DD   DSN=&&SEND2PC,UNIT=&WORK,SPACE=(CYL,(2,2)),
//        DCB=(BUFNO=&BUF,RECFM=FB,LRECL=133,BLKSIZE=13300),DISP=(,PASS)
//PCWKCOPY   DD   UNIT=&WORK,SPACE=(CYL,(2,2)),
//        DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=3120)
//PCWORK01   DD   UNIT=&WORK,SPACE=(CYL,(2,2)),
//        DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PCWORK02   DD   UNIT=&WORK,SPACE=(CYL,(2,2)),
//        DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PRINT      DD   SYSOUT=&PRINT,DCB=BLKSIZE=133
//SORTLIB    DD   DSN=SYS1.SORTLIB,DISP=SHR
//SORTMESS   DD   DUMMY,DCB=BLKSIZE=133
//SORTWK01   DD   UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK02   DD   UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK03   DD   UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SYSOUT     DD   DUMMY,DCB=BLKSIZE=121
```

Exhibit 7
Panvalet Independent Mode PROC - PANACL

Introduction to the Alternate Compile Listing Facility

The Alternate Compile Listing Facility of DCD IV has one primary function. That is to provide an alternative listing from the one produced by the COBOL compiler with information provided in a way which will reduce substantially the time spent in maintaining a COBOL program.

The following DCD IV reports are available through the Alternate Compile Listing Facility of DCD IV for replacing significant parts of the COBOL compiler listings:

1. Source Listing (Replaces compiler source listing)
2. Condensed VERB Report
3. CALL Statements
4. COPY Statements
5. Figurative Constants
6. Literals
7. Special Registers
8. Data Division Condensed Cross Reference
   (Replaces compiler data name cross reference)
9. Procedure Division Condensed Cross Reference
   (Replaces compiler procedure name cross reference)
10. Unused Paragraphs and Sections
11. Unused 01 Records
12. Unused Data Names
13. Overflow report for Indirect References
    (Only exists for fields with multiple lines of Indirect References – Most Indirect References are shown in the Data Divisions)

Some reports produced by the COBOL compiler (e.g. DMAP and PMAP reports) have no corresponding reports produced by the Alternate Compile Listing Facility of DCD IV. Whether using commercial packages such as COBOL/Aid, the CA-Optimizer or just running the compiler stand alone, features are available within DCD IV to produce one complete source listing for the COBOL programmer to work from.

Samples of the reports produced by the Alternate Compile Listing Facility along with a description of each are provided in this manual. See “Overview of Alternate Compile Listing Facility Reports”.

Overview of Alternate Compile Listing Facility Reports

1. Source Listing

The Alternate Compile Listing Facility Source Listing is the main report. While other DCD IV and compiler cross reference reports center around the Source Listing Report, most maintenance of the COBOL program in DCD IV is done without consulting cross-reference reports.

Besides holding a listing of the COBOL program, the DCD IV Source Listing Report also contains uniquely formatted cross-reference information. The formation of this information is done in one format for the Data Division and is done in another format for the Procedure Division.

DATA DIVISION

In the Data Division part of the listing, formatting is done as follows:

1. A Procedure Division look-alike statement is generated.
2. The data name from the left-hand side of the listing is represented by an # on the right hand side of the listing.
3. The compiler sequence number of the Procedure Division Statement(s) is put in parentheses.

For example, the statement:

```
05  WS-NEXT-COLUMN  PIC S9 (4) COMP VALUE ZERO.      > Add 1 to # (1019)
```

indicates that a Procedure Division statement ADD 1 TO WS-NEXT-COLUMN will be found at compiler line number 1019 within the program.

If another data name is involved in the associated Procedure Division statement, then the compiler (or DCDIII) sequence number of that data name is given following an @ character.
For example:

```
05 WS-NEXT-COLUMN PIC S9(4) COMP VALUE ZERO.       > If  #  = WS-MAX-COLUMN @321 (1005)
```

If the same Procedure Division statement is used more than once, then multiply sequence numbers are provided. For example:

```
05  WS-NUMBER-TIMES PIC S9(3) COMP-3 VALUE ZERO.    > Move WS-MAX-PD-DIGITS @322 to # (939,962,1017)
```

In some instances, only a part of the Procedure Division statement is provided. For example:

```
05  WS-NUMBER-TIMES PIC S9(3) COMP-3 VALUE ZERO.    > Perform-Until # =  ZERO  (951,974,1031)
```

Most instances, however, have the entire COBOL statement from the Procedure Division shown. For example:

```
05   WS-NUMBER-TIMES              PIC S9 (3)   COMP-3 VALUE ZERO.      > Subtract 1 from # (1040)
```

In many cases, where the Procedure Division statements are similar, but relate to different operands, the narrative will not reprint the left most part of the Procedure Division statement that is unchanged between the similar statements. For example:

```
05  WS-MAX-PD-DIGITS             PIC  S9 (3)   COMP-3 VALUE +5.        > If # = 3 (942,965,1022,1050), 4 (945, 968,1025, 1064)
                                                                          Move 03 to # (497), 04 to # (501)
```

When no narrative appears along side a Data Division name, this indicates that the data name is unreferenced.

When narrative is present, Indirect References will also be shown for procedure division Activity that is present for redefined fields of this field and other group field and any field that has overlapping field positions of this field. See bolded line just below.

* * *

```
SQ-NBR  1----6  PROGRAM-ID  DCDLOGIC   01/01/01  14:56   PAGE   09   73----80   #  REFERS TO  DATA-NAME  AT  THIS  SQ-NBR

320     014000  05  WS-NEXT-COLUMN           PIC  S9 (4)   COMP   VALUE ZERO.     >  Add 1 to # (1019)
                                                                                    If #  > WS-MAX-COLUMN @321 (1005)
                                                                                    Move 02 to # (1008)
                                                                                    Set # to W34-INDEX @276 (1041)
                                                                                    Set W34-INDEX @276 TO # (1020)
                                                                                    Indirectly Changed @ 318
321     014100  05  WS-MAX-COLUMN            PIC  S9 (4)   COMP   VALUE +34      >  If WS-NEXT-COLUMN @320 > # (1005)
                                                                                    If WS-MAX-PD-DIGITS @322 > # (1007)
                                                                                    Move 34 to # (893)
                                                                                    Indirectly Changed @ 318
322     014200  05  WS-MAX-PD-DIGITS          PIC  S9 (3)   COMP-3 VALUE +5.      If # = 3 (942,965,1022,1050), 4 (945,968,
                                                                                       1025,1064)
                                                                                 >  If # > WS-MAX COLUMN @321 (1007)
                                                                                    Move # to WS-NUMBER-TIMES @324 (939, 962,
                                                                                       1017)
                                                                                    Indirectly Changed @ 318
323     014300  05  WS-NARR-CODE-INC         PIC  S9 (3)   COMP-3 VALUE ZERO.  >  Compute S-WORK-NARRATIVE-CODE @299 = #
                                                                                     (682, 694, 705)
                                                                                    Move 03 to # (674) , 06 to # (678) , ZERO
                                                                                       to # (670)
                                                                                    Indirectly Changed @ 318
324     014400  05  WS-NUMBER-TIMES           PIC  S9 (3)   COMP-3 VALUE ZERO.  >  Move WS-MAX-PD-DIGITS @322 to # (939, 962,
                                                                                       1017)
                                                                                    Perform-Until # = ZERO (951, 974, 1031)
                                                                                    Subtract 1 from # (1040)
                                                                                    Indirectly Changed @ 318
325     014500  05  WS-RECORDS-TO-SORT        PIC  S9 (9)   COMP   VALUE ZERO.
```

Exhibit 8

Source Listing Report - Data Division

PROCEDURE DIVISION

The cross-reference information for the Procedure Division accommodates two types of information.

a. **SQ-NBR=S**

The first type references back to the Data Division (Procedure Division statements such as MOVE or ADD referencing a data name which resides in the Data Division). For these, DCD IV provides a sequence number referencing the line where the data name resides in the Data Division. For example:

```
1017        MOVE   WS-MAX-PD-DIGITS     TO   WS-NUMBER-TIMES.       322  324
```

The first data name, WS-MAX-PD-DIGITS, is documented by the first number on the right, 322, which points to the Data Division sequence number where WS-MAX-PD-DIGITS resides. The second number, 324, references the Data Division sequence number where WS-NUMBER-TIMES resides. See Exhibit 9.

b. **LOGIC FLOW**

The second type, references transfer of control statements such as GO TO or PERFORM, with references to or from another area of the program or statements which reference an external program. DCD IV handles these by providing appropriate narrative on the right and (if not external to the program) by providing a sequence number of where the transfer of control is going to or coming from. An example of a GO TO is provided here:

```
1028        GO TO  B999-EXIT.                                    GO TO 1044

1044    B999-EXIT.                                               COMES FROM GO TO 1028
```

If the transfer of control statement is conditional on the action of an IF, AT END, or other conditional statement, then the four letters COND will precede the generated narrative. See the GO TO in Exhibit 9.

PERFORMS are handled in the following manner:

```
1030          PERFORM  B500-FLOAT-FL2-IN  THRU  B599-EXIT.          PERFORM 1036 THRU 1042
                 .
                  .
                   .
1036          B500-FLOAT-FL2-IN.                                     PERFORMED BY 1030
                 .
                  .
                   .
1042          B599-EXIT.  EXIT.                                      RETURN TO PERFORM AT 1030
```

Statements that transfer control to or from another program are documented accordingly with statements such as:

```
              PROCEDURE DIVISION.                                    BEGIN OF PROGRAM

                  CALL 'DCDPRINT'.                                   CALL TO EXTERNAL PROGRAM

                  GOBACK.                                            GOBACK
```

* * *

```
SQ-NBR 1------6        PROGRAM-ID    DCDLOGIC    01/01/2001  14:56    PAGE  23    73------80 SQ-NBR=S          LOGIC FLOW

  1017  033400      MOVE  WS-MAX-PD-DIGITS TO  WS-NUMBER-TIMES.                    322 324
  1018  033500
  1019  033600      ADD          1                TO  WS-NEXT-COLUMN.             320
  1020  033700      SET W34-INDEX                 TO  WS-NEXT-COLUMN.             276 320
  1021  033800
  1022  033900      IF        WS-MAX-PD-DIGITS    =   3                           322
  1023  034000                  SET  FL2-INDEX  TO     3                          292
  1024  034100      ELSE
  1025  034200            IF  WS-MAX-PD-DIGITS    =   4                           322
  1026  034300                SET FL2-INDEX     TO     2                          292
  1027  034400           ELSE
  1028  034500                GO TO B999-EXIT.                                                 COND GO TO 1044
  1029  034600
  1030  034700      PERFORM B500-FLOAT-FL2-IN   THRU  B599-EXIT                                PERFORM 1036 THRU 1042
  1031  034800           UNTIL                      WS-NUMBER-TIMES  =  ZERO.       324
  1032  034900
  1033  035000 B299-EXIT. EXIT.                                                          RETURN TO PERFORM AT 880
  1034  035100
  1035  035200
  1036  035300 B500-FLOAT-FL2-IN.                                                         PERFORMED BY  950 973 1030
  1037  035400      MOVE FL2-ALPHA-POS (FL2-INDEX) TO W34-POS (W34-INDEX).              291 292 275 276
  1038  035500      SET FL2-INDEX       UP BY  1.                                       292
  1039  035600      SET W34-INDEX       UP BY  1.                                       276
  1040  035700      SUBTRACT   1              FROM  WS-NUMBER-TIMES.                    324
  1041  035800      SET WS-NEXT-COLUMN      TO  W34-INDEX.                            320 276
  1042  035900 B599-EXIT. EXIT.                                                          RETURN TO PERFORM AT 973 1030
  1043  036000
  1044  036100 B999-EXIT.                                                                COMES FROM GO TO 1028
  1045  036200      EXIT.                                                                END OF OUTPUT PROCEDURE FROM 511
```

Exhibit 9

Source Listing Report - Procedure Division

2. Condensed VERB Report

The Condensed VERB Report shows all references for each VERB in the Procedure Division. Some verbs such as PERFORM are broken up into two categories (e.g. PERFORM & PERFORM THRU)

The Verb sequence numbers are listed in a string of numbers at the right of VERB.

The following sequence is used for this report:

1. VERB
2. Sequence Number

See Exhibit 10 below for an example of the Condensed VERB Report.

VERB REPORT FOR PROG103

ACCEPT	1203	1569	2045							
ADD	982	995	1256	1290	1337	1498	1499	1503	1602	
CLOSE	1572									
COMPUTE	1545	1547	1549	1551	1623	1625	1627	1629	1660	1783
DISPLAY	2041	2042	2043	2163						
.										
.										
.										
.										
STRING	1802									
SUBTRACT	961	984								
WRITE	1337	1924	1927	2011	2013					

Exhibit 10

Condensed VERB Report

3. CALL Statements

The CALL Statement Report shows all ENTRYs into a program and CALLs out of the program in a concise report provided for quick and easy analysis of CALL activity within a program.

For Dynamic CALL names, up to two extra lines may precede the documentation for this line show any Data Division literal and any immediate 'MOVE literal to Dynamic-Call-Name'.

Each ENTRY or CALL is listed on one line. The number of parameters associated with that ENTRY or CALL is also listed on the same line along with a sequence number for finding the ENTRY or CALL within the program.

The following sequence is used for this report:
1. CALL name (or ENTRY name)
2. Sequence number in the Procedure Division of where the CALL or ENTRY is found.

4. COPY Statements

The COPY Statements Report gives a listing of all COPY members used within the program and for CICS, DL1 & DB2 programs fives a listing of all INCLUDE members.

Each COPY statement is listed on one line. Additional information associated with the COPY statement such as SUPPRESS, the REPLACING clause and the clause OF LIBRARY-NAME have their presence indicated as shown in Exhibit 11. The division where the COPY statement resides is also shown, as is the sequence number of where the COPY statement may be found.

The following sequences are used for this report:
1. COPY text-name
2. Sequence number of where the COPY statement resides

See Exhibit 11 below for an example of CALL & COPY statement formatting.

```
CALL STATEMENTS

478  PROGRAM    ENTRY      DCDLOGIC       USING   1    PARAMETER
482             CALL       DCDPRINT       USING   2    PARAMETERS
653             CALL       DCDPRINT       USING   2    PARAMETERS
702             CALL       DCDPRINT
552             CALL       DCDSTAMP

COPY STATEMENTS

     DATA DIVISION      344     COPY    DCDLINK         SUPPRESS                    OF LIBRNAME
     DATA DIVISION      105     COPY    PARATYP2                    REPLACING
     DATA DIVISION      204     COPY    PDNARTBL

INCLUDE STATEMENTS

     DATA DIVISION      356  INCLUDE PDINCLUD
     DATA DIVISION      219  INCLUDE SALESTB3
```

Exhibit 11
CALL and COPY Statements Reports

5. **Figurative Constants**

The Figurative Constants Report lists occurrences of each Figurative Constant by sequence number of where they occur in the program.

Figurative Constants include the following:ZERO(S) (ES), SPACE(S), HIGH-VALUE(S), LOW-VALUE(S), QUOTE(S) and ALL literal.

For purposes of listing the Figurative Constants, the plural and single form of the word are treated and listed as one. For example, ZERO, ZEROS and ZEROES are listed as ZERO(S) on the report.

ALL literals are listed in the Literals Report, not in the Figurative Constants Report. The Literals Report directly follows the Figurative Constants Report. Any occurrences of the ALL literal are listed first within the Literals Report. See Exhibit 13.

The following sequence is used for this report:

1. Figurative Constants in alphabetic order
2. Sequence number of where the Figurative Constant is used.

See Exhibit 12 for an example of formatting of the Figurative Constants Report.

* * *

FIGURATIVE CONSTANTS

LOW-VALUE(S)	095	097	486	493										
SPACE(S)	098	099	328	330	322	334	336	394	487	494	568	633	645	662
	711	722	759	771	783	800	833	886	1018					
ZERO(S)	101	171	172	173	316	317	318	319	320	323	324	325	630	638
	667	671	681	704	708	715	719	764	776	780	797	830	943	962

Exhibit 12

Figurative Constants Report

6. Literals

The literals Report lists all occurrences of ALL literal, nonnumeric literals within quotes and numeric literals by sequence number of where they occur in the program.

ALL literal items are listed first, putting them closer to the Figurative Constants Report just above or ahead of this report.

Thirty characters are provided for listing the non-numeric literal including the quotes that surround them. If the literal is not over 28 characters, then the entire non-numeric literal is shown. If the literal is over 28 characters, then only the first 26 characters are shown, followed by two periods and the ending quote. See Exhibit 13 for two examples of a literal over 28 characters long.

The following sequence is used for this report:

1. ALL literals are placed ahead of other literals
2. Literal value (for non-numeric literals, the surrounding quotes also figure in the sorting sequence)
3. Sequence number of where the literal is used

See Exhibit 13 for an example of the Literals Report.

* * *

LITERALS

ALL‘9’	849	850	858	864	1007						
+34	321										
+5	322										
‘PF2’	486										
‘PF3’	493										
‘000 UNUSED ..’	254	256									
‘0726 ALTER NNNN TO PROCED..’	1082										
‘1’	369	397									
‘2’	370										
‘3’	371										
‘A’	398										
‘COND’	1098										
‘DCDLOGIC END WS DCDLOGIC’	340										
‘E’	457										
‘1’	424										
‘N’	383	502	871	888	892						
‘0’	460										
‘Y’	144	147	329	331	333	335	337	353	356	358	361
	375	378	382	386	389	393	404	407	410	419	426
	442	445	472	537	619	742	851	859	893	906	932
01	178	627	896								
1	959	982	1030	1039	1049	1050	1051				
2	957	980	1037								
	953	954	976	977	1033	1034	1061				

Exhibit 13

Literals Report

7. Special Registers

The Special Registers Report lists all occurrences of Special Registers.

Special Registers refer to compiler generated areas that may be used in conjunction with specific COBOL features. The following are examples of Special Registers:

1. CURRENT-DATE
2. DATE
3. DEBUG-ITEM
4. DEBUG-SUB-1
5. LINAGE-COUNTER
6. RETURN-CODE
7. SORT-RETURN
8. TALLY
9. TIME

Only those Special Registers found within the program will be listed in this report. If no Special Registers are used, the report will not appear.

The following sequence is used for this report:

1. Special Registers
2. Sequence number of where the Special Register is used.

See Exhibit 14 for an example of the Special Registers Report.

* * *

SPECIAL REGISTERS

CURRENT-DATE 744
RETURN-CODE 604 843 849 1283
TIME-OF-DAY 746

Exhibit 14

Special Registers Report

8. **Data Division Condensed Cross Reference**

The Data Division Condensed Cross Reference Report provides an alphabetic listing of the data names within the Data Division.

What is unique about this report is that no references are given to the Procedure Division statements that reference the data name. The only sequence number given points to the field's location within the Data Division. The cross reference given at that location within the Source Listing Report gives in COBOL everything that happens to this field.

Besides listing the data name and the sequence number of its location, four characters are reserved alongside the listing to provide the following information about the data field:

1. The level number (01-49, etc.) associated with this field
2. The letter G for those fields which are GROUP items
3. The letter's INDX for index items
4. The letter's FILE for file names

It is recommended that this report be used in place of the compiler cross reference when using the DCD IV Source Listing Report for the following reasons:

1. The Cross Reference Report is a much less used report when using the DCD IV Source Listing Report.
2. The narrative alongside each field in the Data Division provides a complete cross reference for that field.
3. The Condensed Cross Reference saves approximately 70% of the paper generated by a compiler cross reference.

The following sequence is used for this report:

1. Data name
2. Sequence number of the data name

See Exhibit 15 for an example of this report.

```
    05  0316  AL-ALTER-CMPLR-NBR                :    88  0370  LINK-PRINT-JCL-DSNAME           :    88   0120 PAR-2-LAST-TOKEN-IN-PROG
    05  0317  AL-ALTER-COLUMN-NBR               :    88  0375  LINK-PRINT-LAYOUTS               :    88   0147 PAR-2-MULTIPLE-OPER…
    05  0318  AL-GO-TO-CMPLR-NBR                :    20  0374  LINK-PRINT-LAYOUTS-SW            :    05   0146 PAR-2-MULTIPLE-OPERAND
    05  0319  AL-PARA-CMPLR-NBR                 :    88  0378  LINK-PRINT-RECORDS05            :    05   0150 PAR-2-NAME-COLUMN-NU
G   01  0092  CAFE-DATA-ENVIRON-NAME            :    20  0377  LINK-PRINT-RECORDS-SW           :    05   0149 PAR-2-NAME-EXP-LINE-NUMBR
    01  0089  DCDLOGIC-BEGINS-HERE              :    88  0382  LINK-PRINT-SOURCE-LISTING       :    88   0129 PAR-2-OUTPUT-PROCEDURE
    01  0339  DCDLOGIC-ENDS-HERE                :    20  0381  LINK-PRINT-SOURCE-LISTING-SW    :    88   0130 PAR-2-OUTPUT-PROCEDURE-TH
    10  0282  FL-ALPHA-POS                      :    88  0386  LINK-PRINT-SYS-REC-ANAL         :    05   0112 PAR-2-PARA-OR-SECT
INDX    0283  FL-INDEX                          :    20  0385  LINK-PRINT-SYS-REC-ANAL-SW      :    88   0117 PARA-2-PARAGRAPH-NAME
G   05  0281  FL-NUMBER-ALPHA                   :    88  0393  LINK-PRINT-UNREF                :    88   0125 PAR-2-PERFORM
    05  0280  FL-NUMBER-NUMERIC                 :    88  0389  LINK-PRINT-VERB-ANALYSIS       :    88   0126 PAR-2-PERFORM-THRU
G   01  0279  FL2-NUMBER-RECORD                 :    20  0388  LINK-PRINT-VERB-ANALYSIS-SW    :    88   0119 PAR-2-PRIOR-TOKEN-OF-PARA-S
    10  0291  FL2-ALPHA-POS                    :    05  0419  LINK-PROGRAM-NAME               :    88   0138 PAR-2-PROGRAM-ENTRY
INDX    0292  FL2-INDEX                         :    05  0458  LINK-QUOTE-VALUE               : G  01   0106 PAR-2-RANGES-FOR-PARAS
G   05  0290  FL2-NUMBER-ALPHA                 : G  01  0345  LINK-RECORD                     :    05   0114 PAR-2-RELEVANT-SECTION
    05  0287  FL2-NUMBER-NUMERIC               : G  05  0438  LINK-RELEASE-DATE               :    88   0118 PAR-2-SECTION-NAME
G   01  0286  FL2-NUMBER-RECORD                :    10  0439  LINK-RELEASE-MONTH              :    05   0152 PAR-2-SOURCE-BEGIN-NBR
    05  0288  FL2-NUMBER-ZZ-999                :    10  0441  LINK-RELEASE-YEAR               :    05   0155 PAR-2-SOURCE-END-NBR
    10  0348  LINK-100                         : G  15  0350  LINK-REPORT-OPTIONS-1-25`        :    05   0108 PAR-2-SOURCE-LINE-NUMBER
G   10  0349  LINK-100-R1                      :    05  0423  LINK-RETURN-CODE               :    88   0134 PAR-2-STOP-RUN
G   10  0404  LINK-100-R2                      :    05  0427  LINK-SORT-REGION               :    05   0110 PAR-2-TOKEN-COLUMN-NBR
    05  0445  LINK-ADDR-OF-DCDPRTLN            :    88  0398  LINK-SYS-REC-REC-ANAL-ALL      :    05   0116 PAR-2-VERB-CODE
    88  0417  LINK-BASIS                       :    88  0400  LINK-SYS-REC-ANAL-DIR-INDIR     :    05   0162 PAR-3-EXPANDED-LINE-NUMBE
    05  0416  LINK-BASIS-SW                    :    88  0397  LINK-SYS-REC-ANAL-ONLY-01       :    05   0166 PAR-3-FILLER
    88  0414  LINK-COMPILE-MODE                :    88  0401  LINK-SYS-REC-ANAL-ONLY-DIR      :    05   0164 PAR-3-NARRATIVE
    05  0413  LINK-COMPILE-MODE-SW             :    20  0396  LINK-SYS-REC-ANAL-SW           : G  01   0160 PAR-3-NARRATIVE-FOR-SR-LST
    88  0456  LINK-COPY-REPLACE-FOUND          :    88  0430  LINK-SYSTEM-EXPIRED             : FILE    0056 PARA-FILE-2
    05  0455  LINK-COPY-REPLACE-FOUND-SW       :    05  0429  LINK-SYSTEM-EXPIRED-SW          : FILE    0065 PARA-FILE-3
    88  0383  LINK-DO-NOT-PRINT-SRC-LIST      :    05  0443  LINK-TIME-OF-DAY               :    01   0098 PARA2-NAME
    88  0394  LINK-DO-NOT-PRINT-UNREF         :    88  0433  LINK-TRIAL-TAPE-EXPIRED         :    01   0099 PARA3-NAME
```

Exhibit 15

Data Division Condensed Cross Reference

9. Procedure Division Condensed Cross Reference

The Procedure Division Condensed Cross Reference Report provides an alphabetic listing of the paragraph/section names within the Procedure Division. If sections are also used, a separate report shows just SECTIONs and is shown at the end of the Paragraph/Section report.

This report is similar in nature to the Data Division Condensed Cross Reference Report in that no references are given to Procedure Division statements which reference the paragraph or section. The only sequence number given points to its location within the Procedure Division. If the paragraph or section is referenced by other Procedure Division statements such as GO TO or PERFORM, narrative will appear alongside the line in the Source Listing Report where the paragraph or section resides. See Exhibit 9 examples of the narrative that appears alongside the Procedure Division lines that contain a paragraph or section (i.e., lines 1033, 1036, 1042, and 1044).

The format of this report, like the Data Division report, has four characters to provide additional information as follows:

1. For paragraph names, these four characters are blank
2. For section names, these four characters contain the letters- SECT

Like the previous report, it is recommended that this report be used over the compiler procedure name report for the same reasons given there, among them a 70% savings in paper.

The following sequence is used for this report:

1. Paragraph/section name
2. Sequence number of the procedure name

See Exhibit 16 for an example of this report.

01/01/2001 15:26 PROCEDURE DIVISION CONDENSED CROSS REFERENCE FOR DCDLOGIC PAGE 29

	0470	003-BUILD-ASSIGN-NAMES	:	0640	A300-GO-TO-DEPENDING	:	0930	B140-TEST-FOR-NUM-1-FLOAT
	0494	010-REBUILD-PDNARTBL-COPY	:	0666	A399-EXIT	:	0953	B150-TEST-FOR-NUM-2-FLOAT
	0504	020-SORT-DATA-NAMES	:	0668	A400-PERFORM-TYPE	:	0976	B170-MOVE-IN-NARRATIVE
	0514	090-GOBACK	:	0714	A499-EXIT	:	0983	B180-WRITE-NARR-RECORD
SECT	0517	A-BUILD-WORK-RECORDS	:	0717	A500-ALTER-PARA	:	0987	B1980-RETURN-NEXT-RECD
	0518	A 010-OPEN-PARA-FILE-2	:	0775	A599-EXIT	:	0999	B199-EXIT
	0522	A020-READ-FIRST-RECORD	:	0778	A600-CANCEL-PROGRAM	:	1003	B200-FLOAT-IN-NEXT-NUMB
	0528	A030-BUILD-WORK-RECORDS	:	0792	A699-EXIT	:	1011	B210-SET-UP-FOR-FLOAT
	0533	A040-CLOSE-PARA-FILE-2	:	0794	A700-ALL-OTHERS	:	1033	B299-EXIT
	0537	A050-END-OF-INPUT-PROCEDURE	:	0825	A799-EXIT	:	1036	500-FLOAT-FL2-IN
	0543	A100-BUILD-WORK-RECORDS	:	0827	A999-EXIT	:	1042	B599-EXIT
	0544	A110-GO-TO	:SECT	0828	B-BUILD-NARRATIVE-RECORDS	:	1044	B999-EXIT
	0561	A120-GO-TO-DEPENDING-ON	:	0830	B010-OPEN-FILE-A	: SECT	1047	C-REBUILD-PDNARTBL-COPY
	0567	A130-PERFORM-TYPE	:	0834	B020-RETURN-FIRST-SORT-REC	:	1048	C010-TEST-MAX-OF-3
	0578	A140-ALTER-PARA	:	0850	B030-PROCESS-ALL-RECORDS	:	1062	C020-TEST-MAX-OF-4
	0584	A160-CANCEL-PROGRAM	:	0843	B030-RETURN-SECOND-SORT-REC	:	1076	C999-EXIT
	0590	A170-ALL-OTHERS	:	0862	B040-CLOSE-FILE-3	: SECT	1078	D-CHECK-FOR-INSERT-COND
	0601	A190-READ-NEXT-RECORD	:	0866	B050-END-OUTPUT-PROCEDURE	:	1079	D010-CHECK-LENGTH
	0610	A199-EXIT	:	0870	B100-PROCESS-ALL-RECS	:	1084	D020-INSERT-COND
	0613	A200-GO-TO	:	0907	B120-CHECK-MATCH-TO-PREV-REC	:	1097	D999-EXIT
	0637	A299-EXIT	:	0926	B130-SET-UP-EXP-LINE-NBR			

01/01/2001 15:26 SECTIONS ONLY REPORT FOR DCDLOGIC PAGE 30

SECT	0517	A-BUILD-WORK-RECORDS	:SECT	1047	C-REBUILD-PDNARTBL-COPY
SECT	0828	B-BUILD-NARRATIVE-RECORDS	:SECT	1078	D-CHECK-FOR-INSERT-COND

Exhibit 16

Procedure Division Condensed Cross Reference

01/01/2001 15:26 INDIRECT REFERENCES (See ACL Report for fields not shown here) PAGE 31

DATA-NAME	SEQ-#	INDIRECT ACCESS FOR THIS FIELD
LINE-28	00025	Indirectly changed@40,60,80,102,103,104,106,107,108,109,111,117,121,125,129,13,133,134, 137,138 Tested @ 105,111, Used @ 110,111,117,121,135,129,130,133,137,138

Exhibit 17

Overflow report to Indirect References

Unused 01 Records Report

01 Records that are completely unused are listed in this report along with unused 77 level entries. Redefined 01 records are shown independently from the 01 record that it redefines.

Sometimes a beginning 01 record is not referenced and is used for setting up VALUEs for a redefined 01 record that follows it. If the first 01 record is not referenced and the next redefined 01 record is referenced, the first 01 record is shown as not referenced and than a CAUTION line is printed showing that the next 01 record is used! Conversely, it is possible to have unused 01 records follow to add space to a previous table. These records should normally not be deleted.

If the first FD 01 record is not unused, including having no OPEN, READ, CLOSE, etc. to the associated FILE name with the FD, than the 01 record is shown as unused, otherwise it will be treated as used. A second, third or more FD 01 record for the same FD will be shown as unused if none of the fields in the respective record including that 01 are unused.

01 records are shown as unused whether or not they reside in a COPY member.

```
09/01/2012     Unused 01 Records and 77 Entries for Prog: ANAR         PAGE  31

 Prog#     Edit#    Lvl    Field Name

 00092     00092     01  WS-BEGINS-HERE
 00216     COPY      01  PRINT-PASSED-RECORD
```

Exhibit 18

Unused 01 Records Report

Note – These 3 new Unused reports are also available on a separate //CLEANUP DD with a LRECL of 80 characters and a BLKSIZE of 3120.

Unused Data Names

Only unused 02-49 level entries are shown in this report. 01 record names, 77 level entries, and 88 level entries are not shown. FILLERs are not shown as unused. 02-49 level entries underneath a 66 level RENAMES clause are shown.

If the entire 01 record was shown above as unused, then individual 02-49 entries are not shown.

Also, 02-49 level entries within a COPY member are not shown as unused, as it is expected that most names in a COPY are not necessarily used in any one program. To clean up COPY book records use the System Record Analysis report in the Tracing Analysis & Other Reports section.

When all of the fields within a GROUP field are unused, then the GROUP field will be shown as unused and the individual fields will not be listed. The only time the group field will not be shown is when a larger group field containing this group field is unused.

Caution must be used before removing a field that is shown as unused. The field may be named for documentation where a FILLER could be used and the field could be necessary to proper running of the program. To prevent against removing a field that should be left in place, Indirect References are shown after each field that is shown as unused. The line numbers of where the other fields are that have overlapping field positions to this field are listed. If no Indirect References are listed than the field may be removed. If Indirect References are shown, then they must be examined carefully before removing the listed field.

The 01 record associated with each field listed in this report is shown with its line number to assist in examining a field.

```
09/01/2012              Unused Data Names for Prog: ANAR             PAGE  32

  Prog#     Edit#    Lvl    Field Name

  00054**** 00054 01  NR-RECORD********************** contains unused fields **
  00058     00058     10  NR-REST-OF-NARR
                          Indirectly Changed @54 Used @54                    <
  00060     00060     05  NR-COUNT-OF-INDIRECTS
                          Indirectly Changed @54 Used @54                    <

  00068**** 00068 01  N4-RECORD********************** contains unused fields **
  00069     00069     05  N4-CMPLR-NBR
                          Indirectly Changed @68                             <
  00070     00070     05  N4-NARRATIVE
                          Indirectly Changed @68                             <
  00074     00074     05  N4-INDIRECTS-FIELD-NOT-USED
                          Indirectly Changed @68                             <

  00082**** 00082 01  WK-RECORD********************** contains unused fields **
  00086     00086     10  WK-REST-OF-NARR
                          Indirectly Changed @82 Used @82                    <

  00113**** 00113 01  WS-COUNTS********************** contains unused fields **
  00115     00115     05  WS-SUB-8
```

Exhibit 19
Unused Data Names Report

Note – These 3 new Unused reports are also available on a separate //CLEANUP DD with a LRECL of 80 characters and a BLKSIZE of 3120.

Unused Paragraphs and Sections

Un-referenced Paragraphs and Sections are shown for the entire program, with the exception of those within a DECLARATIVES SECTION. All paragraphs and sections that are present in any Declaratives code are accepted as used and will never be reported as being unused.

The first tag (beyond any Declaratives Section, if present) whether it is a SECTION or a PARAGRAPH name is treated as an implied fall through and is never treated as un-referenced. If the first tag in the program is a SECTION than all paragraphs in that SECTION are treated as a fall through up until the first found STOP RUN, GOBACK, or EXIT, following a coded period within that section. If the first tag in the program is a paragraph name, than all paragraphs are treated as a fall through up until the first found STOP RUN, GOBACK, or EXIT following a coded period or the first found SECTION.

When option UPI (the default) is used to print this report, all paragraphs or sections within a PERFORM range whether it is a perform of a section or a range of paragraphs or sections will not be listed as unused, but will be treated as being used in the range of the PERFORM. To show these paragraphs or sections, use the option NOUPI.

SECTIONS if present and found to be not used, are listed in their own report ahead of PARAGRAPHS.

When a section is shown as being un-referenced, all paragraphs within this section will **also** be shown as un-referenced within the Paragraph report.

If a SECTION is otherwise un-referenced, but there is either an ENTRY verb into the section or there is a reference to a paragraph within the SECTION, than the SECTION will be listed as un-referenced and an additional line will immediately follow to show the presence of one or more ENTRY verbs and/or the presence of paragraphs being referenced.

If a PARAGRAPH is un-referenced, but there is one or more ENTRY verbs within the paragraph, that the paragraph will be shown as un-referenced, and an additional line will immediately follow to show the presence or one or more ENTRY verbs being present.

Before removing any SECTIONS or PARAGRAPHS, it is up to the user to insure that a fall through does not exist or perhaps the routine's access is commented out and needs to be kept.

If a fall through exists:

If it is intended, then it is recommended that this logic be well documented as to why. If it was not intended, there is the possibility of an existing PERFORM Error and the code should be looked at closely. If the user is unsure whether or not a fall through may exist within the logic, one suggestion is to test for it by adding an additional un-referenced paragraph with a single DISPLAY just ahead of the paragraph or section that shows as being un-referenced. If the DISPLAY is invoked, during any test or production running of the program, then that is proof that a fall through exists and the user is cautioned to look more seriously at why this exists.

If a fall through does not exist, then the paragraph or section with all code may be removed!

```
09/01/2012 14:27   Unreferenced PARAGRAPHs and SECTIONs for DEMOPGM    Page  25
 Before removing any routine, check to be sure that FALL THRUs are not intended

                                Unused  SECTIONS
 Prog#  Edit#  Section/Paragraph Name         Message or Warning
 00560  00506 H-ROUTINE-TO-TEST-BACKUP       SECTION not externally referenced
09/01/2012 14:27   Unreferenced PARAGRAPHs and SECTIONs for DEMOPGM    Page  26
 Before removing any routine, check to be sure that FALL THRUs are not intended

                                Unused  PARAGRAPHS
 Prog#  Edit#  Section/Paragraph Name         Message or Warning
 00561  00507 H010-ROUTINE-TO-SHOW-CURRENT   PARAGRAPH not externally referenced
 00567  00513 H999-EXIT                      PARAGRAPH not externally referenced
09/01/2012     Unused 01 Records and 77 Entries for Prog: DEMOPGM      PAGE  27
```

Exhibit 20

Paragraphs and Sections Report

Note – These 3 new Unused reports are also available on a separate //CLEANUP DD with a LRECL of 80 characters and a BLKSIZE of 3120.

Use of DCD IV PARM Options

This heading is provided to make the user aware of the way in which PARM fields are used to specify options for DCD IV. For a complete list of the options available and more information on executing the Alternate Compile Facility: finish reviewing this heading, review the heading on "Use of DCD IV PROCS and Symbolics," then consult the Table of Contents and go to the beginning headings in this section.

Options to control execution are provided through the use of PARM fields. The user provides control information and uses the PARM field as the means to pass this information through to the DCD IV program.

Two types of control fields may be entered via the PARM field.

1. Keyword options which consist of:
   a. A leftmost identifying field
   b. An equals (=) sign
   c. A value field following the equal sign
2. Non-keyword options which consist of:
   a. A leftmost identifying field (with or without the two letters NO ahead of it)

Keyword options should be enclosed in single apostrophes as shown here:

```
'LNCNT=60'
```

There is no reason to enclose non-keyword options in single apostrophes.

The following shows the PARM field for indicating the printing of the Source Listing Report both with and without the prefix NO ahead of it:

```
SOURCE
NOSOURCE
```

When NO precedes the PARM field specified, the option is turned off. When the PARM option is specified without the NO prefix, the option is turned on.

For both non-keyword and keyword PARM fields, the following information applies:

1. Most of the PARM fields are of the non-keyword type.
2. For non-keyword PARM fields and for the leftmost identifying field in a keyword PARM field, the field may be abbreviated to the first 3 characters. The following examples are provided:

```
'LNC=60'
SOU
NOSOU
```

3. When the PARM option is not specified in the PARM field, then an internally specified default is used. This default is provided for every non-keyword and for every keyboard option in this manual by the use of an underline. Two examples are provided:

```
LNCNT=nn
LNCNT=60

SOURCE
NOSOURCE
```

   The above two examples indicate that the default is to print 60 lines per page and that unless otherwise specified, the Source Listing Report is to be printed.

4. PARM fields must be separated by commas. Also, the entire PARM field should be enclosed by parentheses. An example follows:

```
PARM=(SOU,NOCALL,NOCOPY,'LNCNT=58',LIT)
```

5. PARM fields may be placed in any order within the parentheses.

The PARM field itself is a keyword parameter which follows the PGM=keyword on the JCL EXEC statement. An example follows:

```
//STEP1     EXEC  PGM=DCDMAIN,REGION=6144K,
//    PARM=(SOU,CAL,NOLIT,'SOR=600000')
```

The users may execute DCD IV programs by providing their own JCL or they may use PROCs (catalogued JCL) which are listed in this manual and should be available for use at your installation.

Sample JCL for invoking DCD IV without the use of a PROC is provided in this manual. However, all the examples used in this manual are provided with the assumption that the user is using standard PROCs provided with this software package.

When using DCD IV PROCs, PARM fields are entered through the use of PROC Symbolics. Entering the PARM fields through the use of symbolics is done in a different manner from what has been shown here for entering the PARM fields. The use of these symbolics is discussed in the next heading, "Use of DCD IV PROCs and Symbolics."

Use of DCD IV PROCs and Symbolics

The execution of DCD IV, as with other software, is made easier through the use of cataloged JCL (PROCs).

This heading provides general information about using PROCs to execute DCD IV. It also provides general information about the use of PROCs and specifically symbolic parameters.

USE OF SYMBOLICS

The use of symbolics when used in a PROC, is an easy way of providing a substitute value within the cataloged JCL just prior to execution of that JCL.

When a symbolic is used in the JCL, it must be preceded by an ampersand (&). An example follows:

```
//DCDWK01    DD    UNIT=&WORK, SPACE= (CYL, (2,2) ), DCB=BUFNO=&BUF
```

The two symbolics are &WORK and &BUF. Prior to execution, these symbolics must be replaced with valid or real values.

Typically, default values for these symbolics are provided within and at the top of the PROC as shown here:

```
//DCDACL    PROC    WORK=SYSDA, BUF=5
```

The ampersand (&) is not used when listed at the top of the PROC. It is only used when embedded within the actual JCL where the substitution value will be placed.

See the DCD IV PROC DCDACL provided in Exhibit 21 and identify the use of symbolic parameters within that PROC.

To use symbolics during the execution of the PROC to override the default defined within the PROC, just add the symbolic in the following format after the EXEC procname. An example follows:

```
//STEP1    EXEC    DCDACL,WORK=DISK,BUF=4
```

Look again at the DCDACL PROC and look at the use of symbolics within the PARM field and also at the corresponding symbolic at the top of the PROC. The following symbolics are listed below:

```
//DCDACL    PROC    SOURCE=,
//                  CALL=,
.
  .
    .
//                PARM=(&SOURCE.SOU,&CALL.CAL,...)
```

Notice that SOURCE= and CALL= have no value associated with them. When the symbolics & SOURCE along with the terminating period and &CALL along with the terminating period are removed and replaced with no value, the substitution JCL looks as follows:

```
//    PARM=(SOU,CAL,
```

which matches the manner in which PARM fields were shown in the previous heading. To turn an option off with the DCDACL PROC, use a symbolic=NO on the EXEC line. An example follows:

```
//STEP1 EXEC  DCDACL,SOURCE=NO
```

The resulting PARM field after replacement of &SOURCE will look like this:

```
//    PARM=(NOSOU,CAL,
```

Most of the options are turned on or off within DCD IV PROCs by either providing no value after the symbolic or by using symbolic=NO on the EXEC PROC JCL. An example follows:

```
//DCD   EXEC      DCDACL,SOURCE=,
//                CALL=NO,
//                COPY=,
//                FIGCON=NO
```

In the above JCL, the Source Listing Report and COPY Statements Report will be produced while the CALL Statements and Figurative Constants Reports will not be produced.

It is important to note that the symbolic used within the PROC and the PARM option are not always the same. For example:

PARM field: FGCONSTS
Symbolic: FIGCON

Also, the PARM field FGCONSTS may be abbreviated to 3 characters, while the symbolic may not be abbreviated and must be used as shown.

Executing DCD IV When Using a PROC

To execute DCD IV when using a PROC, simply enter an EXEC DCD IV PROC line, enter any changes to the PROC by using symbolics and add any indicated extra DD cards into the job stream.

The following is an example of executing the DCDACL PROC to produce all DCD IV Alternate Compile Listing Facility Reports available with the exception of the Procedure Division Condensed Cross Reference Report. Also, unreferenced names will be omitted from the Data Division Condensed Cross Reference Report. The DCDACL PROC is shown on the next page.

```
//STEP1     EXEC   DCDACL,CPROCDV=NO,UNREF=NO
//COBOLIN   DD       DSN=USER.LIBRARY(PROG831),DISP=SHR
//COPYLIB   DD       DSN=USER.COPYLIB,DISP=SHR
```

```
//DCDACL   PROC SOURCE=,          *  PRODUCE  SOURCE                        REPORT
//              CALL=,            *  PRODUCE  CALL                          REPORT
//              COPY=,            *  PRODUCE  COPY                          REPORT
//              FIGCON=,          *  PRODUCE  FIGURATIVE CONSTANT           REPORT
//              LITERAL=,         *  PRODUCE  LITERAL                       REPORT
//              SPREGS=,          *  PRODUCE  SPECIAL REGISTER              REPORT
//              CDATADV=,         *  PRODUCE  CONDENSED DATA DIV            REPORT
//              CPROCDV=,         *  PRODUCE  CONDENSED PROC DIV            REPORT
//*
//              RESOLVE=,         *  RESOLVE  COPY MEMBERS WHEN FOUND
//              UNREF=,           *  INCLUDE  UNREF NAMES IN CROSS REFERENCE
//*  USE XXXX=NO ABOVE TO TURN OFF (E.G. COPY=NO TO OMIT COPY REPORT)
//*
//              OTHER=',' ,       *  USED TO ENTER OTHER PARM OPTIONS
//              LINECNT=60,       *  NUMBER OF LINES TO PRINT PER PAGE
//              BUF=5,            *  USE BUF=5
//              PRINT='*',        *  SENT PRINTER OUTPUT TO MSGCLASS
//              REG=6144K,        *  REGION SIZE
//              SORTREG=600000,   *  MAKE 600000 MINIMUM AVAILABLE TO SORT
//              WORK=SYSDA        *  UNIT=SYSDA, DISK OR OTHER
//*   PROC TO RUN THE 'ALTERNATE COMPILE LISTING' FACILITY OF DCD IV
//*       BY ITSELF, WITHOUT MAKING REFERENCE TO THE COBOL COMPILER
//*
//*   MARBLE COMPUTER, INC.     1-800-252-1400     PROC=DCDACL       RELEASE  4.0
//*                                                                      LM090112
//DCD    EXEC  PGM=DCDMAIN,REGION=&REG,
//           PARM=(&SOURCE.SOU,&CALL.CAL,&COPY.COP,&FIGCON.FGC,
//             &LITERAL.LIT,&SPREGS.SPR,&CDATADV.DDC,&CPROCDV.PDC,
//             &RESOLVE.RES,&UNREF.UNR,&OTHER,
//             'SOR=&SORTREG','LNC=&LINECNT')
//*
//*   INSERT  STEPLIB  HERE  IF  NECESSARY
//*
//CLEANUP     DD  DUMMY,DCB=(LRECL=80,BLKSIZE=3120)
//CONTROL     DD  DSN=USER.PDS (DCDCNTRL ) , DISP=SHR
//*
//*   INSERT  COPYLIB  HERE  IF  NECESSARY
//DCDWK01     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK02     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK03     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK04     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK05     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK06     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK07     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
//DCDWK08     DD  UNIT=&WORK,SPACE=(CYL,(2,2)),DCB=BUFNO=&BUF
 //*
//PCTEMPFL    DD  DSN=&&SEND2PC,UNIT=&WORK,SPACE=(CYL,(2,2)),
//       DCB=(BUFNO=&BUF,RECFM=FB,LRECL=133,BLKSIZE=13300),DISP=(,PASS)
//PCWKCOPY   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//       DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=3120)
//PCWORK01   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//       DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//PCWORK02   DD  UNIT=&WORK,SPACE=(CYL,(2,2)),
//       DCB=(BUFNO=&BUF,RECFM=FB,BLKSIZE=13300)
//*
//PRINT       DD  SYSOUT=&PRINT,DCB=BLKSIZE=133
//SORTLIB     DD  DSN=SYS1.SORTLIB,DISP=SHR
//SORTMESS    DD  DUMMY,DCB=BLKSIZE=133
//SORTWK01    DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK02    DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SORTWK03    DD  UNIT=&WORK,SPACE=(TRK,(100),,CONTIG)
//SYSOUT      DD  DUMMY,DCB=BLKSIZE=121
```

Exhibit 21

DCDACL PROC

Bringing COBOL to the PC for easy Analysis

With the introduction of DCD IV*, analysis of COBOL programs is made available on the PC.

DCD IV on the mainframe side has added a new file for transferring via FTP software to the PC. This file within the DCD step has a DD name of PCTEMPFL and this temporary data set is passed on to the next (or a following) step for transferring via FTP to the PC.

Instructions for correctly using FTP to transfer this file to the PC are given under the heading '**Viewing the Alternate Compile Listing on the PC**' within this section.

This file once on the PC and under the control of Marble software on the PC, makes the source code of the program being processed, all COPY members used by this program, and the full 'Alternate Compile Listing' available through this one transferred file.

A PC software package (CAT-ACL) is now incorporated within DCD IV to facilitate the analysis of COBOL programs on the PC. This software uses the full 'Alternate Compile Listing' found on the file transferred for use in CAT-ACL. Installation of this CAT-ACL software is done through Marble's web site: www. marblecomputer.com.

Separate PC software (CAT – Cool Auditing Tool) is also available through Marble and presented on our web site that uses the COBOL program and COPY members on this file for invoking an intelligent editor for COBOL and many other PC features for modifying COBOL on the PC. See Marble's web site: www. marblecomputer.com for full features available within CAT.

*DCD IV replaces DCD III as of September 1, 2012

Release 4.0

DCD IV

Tracing & Analysis and Other Reports

Facility

DCD IV

Tracing & Analysis and Other Reports Facility

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Use of This Section

This section is designed for Tracing & Analysis and use in producing other COBOL reports from one or more COBOL programs at one time. Topics that are initially necessary when first starting to use the DCD IV software package are shown below and will be in the middle of this section or in another section. Topics that are designed to be referenced quickly in everyday use are found in the beginning of this section for quick reference.

When using this manual for the first time, read the following topics first:

1. Overview of DCD IV COBOL Reports
2. Use of DCD IV PARM Options (in Section A)
3. Use of DCD IV PROCs and Symbolics (in Section A)

The second and third topics are covered in the section “Alternate Compile Listing Facility”. These topics were also topics necessary for using the Alternate Compile Listing Facility part of the DCD IV software system.

After reading and reviewing the above topics, continue using this section starting at the top of the Table of Contents.

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Choice of DCD IV Reports

The following is a list and brief description of the COBOL reports and one file which are available by using the PROCs and PARM options shown in this section. All of the reports listed below are available for one or multiple COBOL programs. A more detailed description with sample reports is available in the, "**Overview of DCD IV Other COBOL Reports**", later in this section.

1. **CALL** Analysis Report - a listing of CALLs and ENTRYs in two report sequences

2. **CALL Hierarchy** Report - shows the organization of CALLs in a system

3. **COPY** Analysis Report - a listing of COPY member usage in two report sequences

4. System **Data Name Cross-Reference** - an expanded cross reference of Data Division names

5. **Data Dictionary** Interface File - a file containing useful information for interfacing with a Dictionary or other engineering projects. See the heading, "**Data Dictionary Interface File**".

6. System Cross Reference for **Figurative Constants** - a listing of the use of figurative constants

7. **Layout** Report - automatic generation of layouts with several options for **custom building**

8. System Cross Reference for **Literals** - (Also, see "**Tracing of Possible Literals**" below.)

9. System **Paragraph** Cross Reference - a cross reference listing of paragraph names

10. **01 Record** Report - a cross reference of 01 records with their computed record length in two report sequences

11. System Cross Reference for **Special Registers** - a listing of the use of Special Registers

12. **System Record Analysis** Report - a listing on one or more selected records with flags showing direct or indirect data movement or comparison on every name within the record

13. **Tracing of Possible Literals by Field** - three different reports showing possible literals and paths used to move a literal to one field – Limited to **one program** at a time.

14. **Tracing & Analysis –** does tracing to find every involved name for selected names. A report is produced showing the original field selected, all overlapping fields which REDEFINE the field, all traced fields (infinite levels), and all Procedure Division references for all fields shown in DCD narrative format. – Limited to **one program** at a time.

15. **Verb Analysis** Report - a listing of the use of Procedure Division verbs with a summary page

Choice of DCD IV PROCs

The three PROCs listed below are available to choose from when invoking Other COBOL Reports. A brief description is given on this page of using these 3 PROCs along with the MBRFETCH PROC. More examples are given on the next two pages and under the heading "JCL Examples", in this section.

1. LIBCOBOL
2. PANCOBOL
3. DCDCOBOL

LIBCOBOL & **PANCOBOL**

The first and second PROC may be used when the COBOL source code resides on Librarian or Panvalet files respectively.

DCDCOBOL

The third PROC is to be used when the COBOL source code resides as member (or members) on a partitioned data set (PDS) or other non-Librarian or non-Panvalet file.

An example is given here using the DCDCOBOL PROC:

```
//STEP1   EXEC   DCDCOBOL,COPY=,DATA=,PARA=
//COBOLIN   DD    DSN=USER.COBOL.LIB(PROG01),DISP=SHR
//               DD    DSN=USER.COBOL.LIB(PROG02),DISP=SHR
//COPYLIB   DD    DSN=USER.COPY.LIB,DISP=SHR
```

The COBOL source code is brought in through the COBOLIN DD statement. Note that two programs were brought in. A different way of bringing in COBOL programs is through the member fetcher procedure MBRFETCH which is explained below.

COPY members are resolved by pointing the COPYLIB DD statement to the PDS(s) that contain the COPY members. The PDS(s) specified here should be the same PDS(s) specified in the SYSLIB DD in your installation's COBOL compile PROC.

Symbolic parameters are used to specify options, such as specifying the reports desired.

MBRFETCH

A fourth PROC is available for bringing in multiple programs at once from partitioned data sets. This PROC is:

4. MBRFETCH

When this PROC is used, the DCDCOBOL PROC is also used and follows the MBRFETCH PROC.

Inputting COBOL Programs and COPY Records

Several methods may be used for providing input into DCD IV. These methods are described below.

The main input to DCD IV when producing the reports mentioned in this section is provided through the COBOLIN DD statement. An example follows:

```
//STEP1    EXEC  DCDCOBOL,DATA=,RESOLVE=NO
//DCD.COBOLIN  DD  DSN=USER.COBOL.PDS(PROGRAM1),DISP=SHR
//                 DD  DSN=USER.COBOL.PDS(PROGRAM2),DISP=SHR
//                 DD  DSN=USER.COBOL.PDS(PROGRAM3),DISP=SHR
```

In the above example, three COBOL programs are entered through the use of the COBOLIN DD.

When Layout Reports are being produced on just COPY records through the use of the DCD IV PARM option (LOR), then the COBOLIN DD statement is used to enter the COPY records. An example follows:

```
//STEP2    EXEC  DCDCOBOL,LAYOUT=,OTHER=LOR
//DCD.COBOLIN  DD  DSN=USER.COPY.LIBRARY(RECORD1),DISP=SHR
//                 DD  DSN=USER.COPY.LIBRARY(RECORD2),DISP=SHR
```

If COPY members are present when handling COBOL programs, they are resolved by pointing DCD IV to user's COBOL COPY libraries. These are the same library (or libraries) pointed to in the SYSLIB DD statement of the user's COBOL compile PROCs. An example follows:

```
//STEP3    EXEC  DCDCOBOL,DATA=
//DCD.COBOLIN  DD  DSN=USER.COBOL.PDS(PROGRAM1),DISP=SHR
//                 DD  DSN=USER.COBOL.PDS(PROGRAM2),DISP=SHR
//                 DD  DSN=USER.COBOL.PDS(PROGRAM3),DISP=SHR
//DCD.COPYLIB  DD  DSN=USER.COPY.LIBRARY,DISP=SHR
```

When the COBOL input is coming from Librarian or Panvalet, then the PROCs LIBCOBOL or PANCOBOL should be used and the COBOLIN DD should be omitted. An example follows:

```
//STEP4    EXEC  PANCOBOL,DATA=
//PAN.SYSIN      DD  *
++WRITE  WORK,PROGRAM1
++WRITE  WORK,PROGRAM2
++WRITE  WORK,PROGRAM3
/*
//DCD.COPYLIB  DD  DSN=USER.COPY.LIBRARY,DISP=SHR
```

The previous example assumes that there are COBOL COPY members in addition to, or in place of Panvalet (or Librarian) INCLUDEs present in the COBOL source by the use of the COPYLIB statement.

When multiple COBOL programs (or in a separate run, multiple COBOL COPY records) are brought into DCD IV from partitioned data sets, a DCD IV partitioned data set member fetcher utility may be used ahead of the DCDCOBOL PROC to simplify the process of entering the COBOL programs. Two examples follow:

```
//STEP5     EXEC   MBRFETCH
//MBR.OUTSET       DD  DCB=(LRECL=80,BLKSIZE=3120)
//MBR.CTLCDMBR   DD  *
INDD=USERNAME=COBOL=MR
//MBR.USERNAME   DD  DSN=USER.COBOL.PDS,DISP=SHR
//STEP5A   EXEC   DCDCOBOL,DATA=
//DCD.COBOLIN      DD   DSN=&&PASSFILE,DISP=(OLD,PASS)
//DCD.COPYLIB      DD   DSN=USER.COPY.LIBRARY,DISP=SHR
```

The above example pulls off all members that are specifically COBOL programs and specifically whose member name starts with the two characters (MR) and passes these COBOL programs to the DCDCOBOL PROC.

```
//STEP6     EXEC   MBRFETCH
//MBR.OUTSET       DD  DCB=(LRECL=80,BLKSIZE=3120)
//MBR.CTLCDMBR   DD  *
INDD=USERNAME=COBRECS=TER
//MBR.USERNAME   DD  DSN=USER.COPY.LIBRARY,DISP=SHR
//STEP6A   EXEC   DCDCOBOL,LAYOUT=,OTHER=LOR
//DCD.COBOLIN      DD  DSN=&&PASSFILE,DISP=(OLD,PASS)
```

The above example pulls off all members that are specifically COBOL records that begin with a valid COBOL level number and specifically whose member name starts with the three characters (TER) and passes these COBOL records into DCD IV for producing Layout Reports on these records.

Further information on the member fetcher PROC is provided under the heading, “Control Statements for Using the MBRFETCH PROC”.

Other Features Supported

This heading provides a list of support for those other features both inside and outside of the standard support for the COBOL compiler that the user may have a need for. Those features supported by DCD IV in this section are:

1. CICS
2. COBOL 68 and earlier
3. COBOL 74
4. COBOL 85
5. COBOL 370, COBOL for MVS & VM, COBOL 390, ENTERPRISE & Z/OS
6. DB2 / SQL
7. DL1
8. Librarian
9. Panvalet

1. CICS

CICS is fully supported by DCD IV. Ideally, the CICS program should be run through the CICS pre-processor before being brought into DCD IV. If the pre-processor step is done, both CICS commands and the CALL statements generated by CICS are documented. If the CICS program is not run through the pre-processor, then generated CALL statements are not documented by DCD IV.

2. COBOL 68 and earlier

PARM option C68 is recommended when all programs being processed are COBOL 68.

3. COBOL 74

Include PARM option NOVS2 for COBOL 74.

4. COBOL 85

Include default PARM option VS2 to indicate the handling of VS COBOL II.

5. COBOL 370, COBOL for MVS & VM, COBOL 390, ENTERPRISE & Z/OS

Include default PARM option VS2, the same as for COBOL 85. When using the ISPF panels, a separate COBOL 370 option is included there for COBOL 370. The separate option is not needed for batch submission.

6. DB2

DB2 programs contain SQL statements. Ideally, the DB2 program should be run through the DB2 pre-processor before being brought into DCD IV. If the pre-processor step is done, the CALL statements generated by SQL are documented. Narrative created by the use of Host variables in SQL statements are listed in the System Data Name Cross Reference and the Layout Reports when the LNR option is used.

7. DL1

DL1 is fully supported by DCD IV. Ideally the DL1 program should be run through the DL1 pre-processor before being brought into DCD IV. If the pre-processor step is done, both DL1 commands and the CALL statements generated by DL1 are documented. If the DL1 program is not run through the pre-processor, then generated CALL statements are not documented by DCD IV.

8. Librarian

When INCLUDEs are used (as opposed to COPY statements), they are resolved when the COBOL source code is brought from Librarian. They are *not* listed within the COPY Analysis Report.

The PROC LIBCOBOL, which contains a Librarian step ahead of the DCD IV step for pulling the COBOL programs off of the Librarian Data File, should be used. See Example 2 under the heading, “Examples”, in this section for assistance in using the LIBCOBOL PROC.

9. Panvalet

When INCLUDEs are used (as opposed to COPY statements), they are resolved when the COBOL source code is brought from Panvalet. They are *not* listed within the COPY Analysis Report.

The PROC PANCOBOL, which contains a Panvalet step ahead of the DCD IV step for pulling the COBOL programs off of the Panvalet Data File, should be used. See Example 1 under the heading “Examples”, in this section for assistance in using the PANCOBOL PROC.

Specifying PARM Options

DCD IV is controlled by the use of PARM options included within the PARM field. However, when using DCD IV PROCs, the entering of PARM fields is done by the means of PROC Symbolics.

The heading, “PARM Options”, on the next page lists the PARM options along with a description of the use of each option. Also, in the following heading is a list showing corresponding PROC Symbolics for PARM options.

How these PROC Symbolics are entered into the JCL is shown in many ways within the “Examples” heading.

A more detailed explanation on the use of options is found in the two headings shown below within the Alternate Compile Listing Facility section.

1. Use of DCD IV PARM Options
2. Use of DCD IV PROCs and Symbolics

PARM Options

BEGIN CONT	Options used in conjunction with WRITPDS & READPDS options. CONT option will not initialize internal work files and is used for the 2nd, 3rd, or later runs using WRITPDS option.
CAHIER NOCAHIER	Produce the CALL Hierarchy Report. See the heading "**Control Statements for CALL Hierarchy**" within this section.
CALL NOCALL CAP / CAC	Produce the CALL Analysis Report. Two sequences will be produced. The first sequence is Program/CALL sequence. The second is CALL/Program sequence. Use **CAP** to produce only Program/CALL sequence. Use **CAC** to produce only CALL/Program sequence.
CICS	This option is always turned on. However, for CICS COBOL programs, the CICS program should be run through the CICS pre-processor prior to being run through DCD IV.
COPY NOCOPY COQ / COR	Produce the COPY Analysis Report. Two sequences are produced. The first is Program sequence. The second is Member sequence. Use **COQ** to produce only Program sequence. Use **COR** to produce only Member sequence.
COF NOCOF	Forces an older compiler standard where COPY statements on the same line with an 01 record with A different 01 record name in the COPY member will use the 01 name within the COPY rather than the 01 record name preceding it.
C68	Use when COBOL 68 is used.
DATA NODATA	Produce the System Data Name Cross Reference. Individual options shown below may be used to enhance the DATA report.
DASELECT	When invoked, the control statements used for the System Record Analysis will also be used to limit the DATA Analysis Report. (See Control Statements for System Record Analysis). When used without producing the System Record Analysis Report, record names in the control statements may instead be just a group or elementary name.
D88 NOD88	This option may be used to individually list out all of the multiple 88 values for each 88 level, when multiple values (e.g. VALUES ARE) are used.
DA1 to DA5	When used, any numeric digits (up to the number specified in this option) which immediately precedes a Data Division name will not be sorted when producing the Data Analysis Report. (As an example, 20ACCT-NAME and 32ACCT-NAME will sort together when option DA2, DA3, DA4 or DA5 is used.) Use only 1 of these options during one run.
DAL NODAL	This option is only effective when one of the options (DA1 to DA5) is used. NODAL removes the leading NODAL selected digits from the data name in the report, while DAL leaves the digits in front of the data name.
DICT	Produce an Interface File for any desired use- including interfacing with a commercial Data Dictionary. (This option has the same effect as invoking the SRA option, i.e. – control statements are required) . The output file is on DD DCDDICT and at job end has a record length of 120 and a block size of 3120. See both "Data Dictionary Interface File" and "Control Statements for System Record Analysis" in this section.
DDF CDD	Option DDF is default and OPENs the DCDDICT file as OUTPUT to clear the file for each run. Option CDD does not clear the file for each run.
DIT DRL, DRF or DRC	Produce Direct Tracing of Literals. See "Control Statements for Literal Tracing" in this section for overview of report and for individual reports. Three reports are available. Sub-option DRC is the default and is for printing all three reports.

DL1	This option is always turned on. However, for DL1 COBOL programs, the DL1 programs should be run through the DL1 pre-processor prior to being run through DCD IV.
DNB NODNB	Flag a warning message for //BYPASS DD entered names used that do not match to a data name in the COBOL program during running the 'Tracing and Analysis' report.
DNF NODNF	Print a warning message for data names not found in the Data Division when resolving Procedure Division statements.
EIB	This option may be used to insert COPY member DFHEIBLK into the COBOL program for cross referencing CICS names EIBDATE, EIBTIME and other EIB fields from that COPY.
ERRORS NOERRORS	NOERRORS may be used to omit the printing of all errors.
FGCONSTS NOFGCONSTS	Produce the System Cross Reference for Figurative Constants.
LAYOUTS NOLAYOUTS	Produce Layout Reports on Data Division records. See the several options that follow for user customizing Layout Reports and see the heading "**Control Statements for Layouts**".

The following options affect the LAYOUT reports:

LFD	Using this option ensures that Layout Reports will be produced on all records within the File Section. This option overrides the default option NOLS1 for records in the File Section. Using this option will automatically invoke or turn on the LAYOUTS option.
LHX	Using this option indicates that in addition to decimal from and to record positions, that hexadecimal from and to record positions will be produced underneath the decimal positions. Using this option automatically turns on the LAYOUTS option.
LHR	Using this option turns on the LHX option. However, the hexadecimal locations will be printed on the right hand side of the Layout Report rather than underneath the decimal locations. If LNR is used as an option, this option will be treated as LHX.
LK1	Using this option will keep 01 records on the same page. No page break will occur when a new 01 is encountered.
LLA	On the printing of the Layout Reports, a plus (+) character is normally used to intersect lines. Use of this option will substitute an asterisk (*) for the plus character.
LLI	On the printing of the Layout Reports, a vertical bar (|) is used for vertical lines. Use of this option will substitute the letter I in place of the vertical character.
LOR	This option indicates that just 01 records are being brought into DCD IV for producing Layout Reports. COBOL programs are not present. When this option is used, the LAYOUTS option is turned on automatically and other report options for producing reports other than Layout Reports are not allowed. When using this option, the COBOL records are brought into the DCD IV system by using the COBOLIN DD. When using this option, place a ceiling limit between 10,000 and 12,000 lines per run. (If the Member Fetcher is used with the LOR option, the associated member name will be printed on the Layout Report.) Do not use this option for COPY MEMBERs where pseudo-text is present and the pseudo-text is not in a valid COBOL format.
LSQ	This option works in conjunction with the LOR option ONLY. This option generates a sequential number in the left margin for each data name found on the Layout Reports. Otherwise, these numbers are suppressed.
LPV NOLPV	This option indicates that a VALUE clause when present will be printed below the data name in The Layout Reports. This option is turned on automatically when the LAYOUTS option is Turned on. It may be turned off by using NOLPV. Notice – VALUE clauses for 88 level entries are inserted automatically on the same line of the 88, regardless of the option used here.

LPP NOLPP	This option indicates that a PICTURE clause which is designed as NE (Numeric Edited) will be printed below the data name in the Layout Reports. This option is turned on automatically when the LAYOUTS option is turned on. It may be turned off by using NOLPP.
LNR	This option indicates that COBOL narrative is to be printed on the right-hand side of the Layout Report. This option is only valid for single COBOL programs. If LOR is used as an option, this option is turned off. If multiple COBOL programs are inputted, narrative will only appear alongside the first one if this option is used.
LS1 NOLS1	This option (if turned on) indicates that Layout Reports should be produced for records that have no elementary fields (levels 02-49) underneath them. If not turned on, (which is the default) they will be omitted. This option will be turned on automatically if option L77 is used.
LTC NOLTC	This option is turned on automatically if the LAYOUTS option is turned on. It indicates that a Table of Contents for the Layout Reports by record name will be produced ahead of the Layout Reports. Unless the LTS option is used, the Table of Contents will be sorted in alphabetic sequence by record name.
LTS	This option when used turns the LTC option on. However, the records in the Table of Contents will not be sorted. They will be left in sequence as they were inputted into DCD IV or as they appear in the COBOL program.
L77	This option when used indicates that Layout Reports should also be produced for 77 level entries.
LITERALS NOLITERALS	Produce the System Cross Reference for Literals.
LNCNT=nn LNCNT=60	Set the maximum lines per page for all DCD IV reports.
NIS	Re-arrange the SORT sequence of the COBOL narrative produced by DCD into primary sequence by compiler sequence number, then verb name. Without this option, the primary sequence is verb name.
NUC	Convert all NARRATIVE produced by DCD IV to UPPER Case Characters.
PARAGRAPH NOPARAGRAPH	Produce the System Cross Reference.
PRANGES NOPRANGES	Produce a set of ranges of beginning and ending expanded (after Copy members have been resolved) sequence numbers for paragraphs and sections within a COBOL program.
QUOTE NOQUOTE DETERMINE	Use the double quote rather than the single apostrophe as a delimiter for alphanumeric literals. The defaulted DETERMINE option allows using the first quote or apostrophe encountered to determine whether to use option QUOTE or NOQUOTE as a delimiter.
RECORDS NORECORDS	Produce the 01 Records Report.
RESOLVE NORESOLVE	This option indicates DCD IV will resolve COPY members by accessing the members on the data set specified on the COPYLIB DD. IF NORESOLVE is used, the COPYLIB DD is not necessary. (COPY members within COPY members are not currently resolved in this section.)

SORTREG=nnnnnnn SORTREG=600000	Indicates the SORT region size in bytes. Do not specify a SORTREG larger than 1,000,000.
SPREGS NOSPREGS	Produce the System Cross Reference for Special Registers Report.
STOP NOSTOP	This option causes DCD IV to immediately stop processing and issue a Condition Code of zero. This option may be used when the DCD IV step is embedded with other steps in a PROC and is not wanted.
SRANAL NOSRANAL	Produce the System Record Analysis Report. When this option is used control statements must also be used. This option is turned on automatically when the DICT option is used. When using this option see "**Control Statements for System Record Analysis**".
	The following options affect the System Record Analysis Report: ***Limit System Record Analysis Report as follows:***
RA1	RA1 - Print only as 01 summary report.
RAA	RAA - The default - no limiting.
RAB	RAB - Select records that have any flags turned on.
RAD	RAD - Select records that have any direct flags turned on.
RAS	RAS - Select records if the direct (S)et flag is turned on.
RAT	RAT - Select records if any (S)et flag is turned on.
S03 S15 S50 S3H S1T	Use one of these options to correct error messages DCDUF010-D or DCDUFA02-D where an OCCURS clause in one or more 01 records causes the combined table space needed for this report to be exceeded. (S03) limits all OCCURS to a maximum of 3 TIMES. (S15), a maximum of 15 TIMES. (S50), 50 TIMES. (S3H), 300 TIMES. (S1T), 1000 TIMES. **Warning:** The smaller the OCCURS (e.g. S03 or S15), the more likely that an existing REDEFINES overlapping the OCCURS will assist in either producing incorrect results and/or causing DCD error messages for invalid DATA DIVISION structures.
SRCOPY NOSRCOPY	Produce the System Record Analysis Report using COPY member names to select which 01 records are selected. (Include option SRDELCOPY if the COPY report is not desired.)
TRACE NOTRACE	Produce the 'Tracing & Analysis' report. See '**Tracing & Analysis Supporting Options**' on the next page. Also, see '**Control Statements for Tracing & Analysis**' in this section.
UNREF NOUNREF	Print or suppress un-referenced names in the System Data Name Cross Reference and System Paragraph Cross Reference. Note - when NOUNREF (the default) is used and PARM option D88 is also used, all 88 level names with either multiple 88's or the THRU clause will be listed whether or not they are referenced.
VERB NOVERB	Produce the Verb Analysis Report.
VR3 NOVR3	Causes DCD IV to emulate Version 3 and earlier versions of 1974 and 1968 COBOL in which sequence numbers are not generated for SKIPs and EJECTs.
VS2 NOVS2	Causes DCD IV to scan for newer 1985 VS COBOL II format. Use NOVS2 for older 1974 COBOL.

(Continued..)

WRITPDS
READPDS

Used to store information over time and/or several runs on an internal DCD IV Data Dictionary using the WRITPDS option and then retrieving the information for reporting during on run using a READPDS option. Do not use this feature when using the 'Tracing & Analysis' Report. See the heading '**WRITPDS and READPDS Options**' in this section for more information.

Tracing & Analysis Supporting Options

These options are available providing the **TRA**CE option is on. See 'Control Statements for Tracing & Analysis' in this section for SELECTing and also for BYPASSing of Names.

Utility Options

YOP
NOYOP

Print a separate page showing all related TRACE options on the PRINT report.

YTEST
NOYTEST

Used to TEST all Select Statements. The only processing that is done is to test all tracing Select Statements and verify that no errors are present. This option will cause any other report options submitted to be overridden and their respective reports will not be produced.

Directly Selected Name Options

YDNARR
NOYDNARR

Produce Procedure Division Narrative for each directly selected field and list the narrative right underneath this field.

Y2PROG
NOY2P

Sort Direct Names by PROGRAM name so one program's names are done ahead of the next. The secondary sort is Alphabetic by data name. To reverse sequence, use NOY2P option.

Overlapping Option
(Applies to REDEFINES, GROUP fields or otherwise Overlapping fields)

Y2INDIR
NOY2INDIR

For each Direct Name selected, this option selects names for every associated REDEFINES, GROUP field, or otherwise Overlapping field.

Trace Options
(Traces infinite levels deep[up to 999 times] to get all possible fields; see TAC=)

YAP
NOYAP

Traces names selected and using overlapping fields and their record positions also traces through these fields to find all possible names that may be affected.

TAC=nnn

Limits the number of Traces to a specific number such as 010 or 025.

Supporting Options for Overlapping (Y2INDIR) and Trace (YAP) Options

YINARR
NOYINARR

Produce Procedure Division Narrative for every overlapping name selected here and list the narrative right underneath this field.

YIPROG
YIALPHA

Within each Directly Selected Name, overlapping names are sorted in program sequence or the order in which they are listed within the COBOL program. To sort in alphabetic sequence, use YIALPHA option.

YAI
NOYAI

Show the existence of overlapping names even if there are no Procedure Division references to this name. To omit names with no Procedure Division references, use NOYAI option.

Corresponding PROC Symbolics

PARM Option	Corresponding PROC Symbolic
CAHIER	**OTHER='CAH,...'**
NOCAHIER	**default**
CALL	**CALL=,**
NOCALL	**default**
CAC / CAP	**OTHER='CAx,...'**
CDD	**OTHER='CDD,...'**
COPY	**COPY=,**
NOCOPY	**default**
COQ / COR	**OTHER='COx,...'**
C68	**OTHER='C68,...'**
DATA	**DATA=,**
NODATA	**default**
D88 / DAn / DAL	**OTHER='Dxx,...'**
DASELECT	**OTHER='DAS,...'**
DICT	**OTHER='DIC,...'**
DIT	**OTHER='DIT=**
DRL / DRF / DRC	**OTHER='DRx,...'**
DNB (or DNF)	**default**
NODNB	**OTHER='NODNB...'**
NODNF	**OTHER='NODNF…'**
EIB	**OTHER='EIB,...'**
NOERRORS	**OTHER='NOERR,...'**
FGCONSTS	**OTHER='FGC,...'**
NOFGCONSTS	**default**
LAYOUTS	**LAYOUT=,**
NOLAYOUTS	**default**
LFD / LHR / LHX / LK1	**OTHER='Lxx,...'**
LLA / LLI / LNR / LOR	**OTHER='Lxx,...'**
LSQ / LS1 / LTC / LTS	**OTHER='Lxx,...'**
L77	**OTHER='L77,...'**
NOLPP / NOLPV / NOLTC	**OTHER='NOLxx**
note: x=letter or number	
LITERALS	**OTHER='LIT,...'**
NOLITERALS	**default**
LNCNT=nnn	**LINECNT=nnn,**

PARM Option	Corresponding PROC Symbolic
NIS	**OTHER='NIS,...'**
NUC	**OTHER='NUC,...'**
PARAGRAPH	**PARA=,**
QUOTE	**OTHER='QUO,...'**
NOQUOTE	**default**
DETERMINE	**OTHER='DET,...'**
RECORDS	**RECORDS=,**
NORECORDS	**default**
RESOLVE	**default**
NORESOLVE	**RESOLVE=NO,**
SORTREG=n	**SORTREG=nnnnnnn,**
SPREGS	**OTHER='SPR,...'**
NOSPREGS	**default**
SRANAL	**SRA=,**
NOSRANAL	**default**
RA1 / RAA / RAB	**OTHER='RAx,...'**
RAD / RAS / RAT	**OTHER='RAx,...'**
S03 / S15 / S50 / S3H / S1T	**OTHER='Snx,...'**
note: n=numeric digit, x=letter or number	
SRCOPY	**OTHER='SRC,...'**
TRACE	**TRACE=,**
NOTRACE	**default**
TAC=nnn	**TRLIMIT=nnn**
UNREF	**OTHER='UNR…'**
VERB	**OTHER='VER…'**
VR3	**OTHER='VR3…'**
NOVS2	**OTHER='NIOVS2...'**

Supporting Options for TRACE option follow:

YTE / YIA	**OTHER='Yxx,...'**
NOYOP / NOYDN / NOY2P	**OTHER='NOYxx,...'**
NOY2I / NOYIN / NOYAI	**OTHER='NOYxx,...'**
NOYAP	**OTHER='NOYAP,...'**
note: x=letter or number	
WRITPDS / READPDS	**OTHER='WRI,...'**
WRITPDS / READPDS	**OTHER='REA…'**

Note: The PROC symbolic **OTHER** is used to enter one or multiple PARM options for which there are no corresponding symbolics. For example: **OTHER='LNR,NOLPV,NOVS2'**

Control Statements for System Record Analysis

The System Record Analysis Report (& Data Dictionary Interface file) requires control statements to select records to report on. The DD for these control cards is CTLCDSRA. The maximum number of control statements must not exceed 775 in the entire file.

More than one set of reports may be run through during one run of DCD IV. Each set of reports should be run on like records which ideally have the same record length and format. The data names do not need the same spelling since fields are matched up by field positions.

To break apart sets of control statements, each set of control statements must begin with a header control statement of the following format:

Column 1 - An asterisk (*) Columns 2 through 72 - Documentation for the user

Within each set of control statements, records must be selected which make up that set. Selecting records requires specifying both program name and record name. Each control statement has two fields: program-id and record name. This control statement uses the following format:

Starting in column 1 - Program-id, *followed by at least one space*
In next available column - Record Name

The field for program-id must contain either a (name) which matches to a COBOL program-id from an Identification Division or the constant -ALL-. If **-ALL-** is used, the record that follows will be pulled for selection from all programs that were entered.

The field for record name must contain either a record name which matches to an 01 record name within the COBOL program or it must be a numeric number for matching to the length of one or more records within a COBOL program. Also, See '**Selecting by COPY Name...**'.

Note - When a number is used, it may be followed by a second number to form a selection range. For example, the control statement (-ALL- 1 7500) without the enclosing parentheses may be used to select all records with an overall record length not greater than 7500 bytes. While the SRA report produced using this range may not be very meaningful, the Data Dictionary file produced may be used for several purposes such as loading data dictionaries or repositories.

An example of control statements follows:

```
//DCD.CTLCDSRA    DD   *
*THIS IS THE TITLE FOR THE FIRST SET
-ALL-  184
*THIS IS THE TITLE FOR THE SECOND SET
-ALL-  MS-RECORD-A
-ALL-  MR-RECORD
*SELECTION FOR CERTAIN RECORDS
PAYR001  RECORD-1
PAYR001  RECORD-2
PAYR002  RECORD-1
PAYR003  224
/*
```

In the example shown, the first set of statements selects all records from all programs which have a record length of 184. In case of variable length records, the largest record length applies.

In the second set, the records MS-RECORD-A and MR-RECORD are selected from all programs.

In the last set, various records were individually selected from programs PAYR001 and PAYR002. In program PAYR003, all records are selected that have an overall record length of 224.

A listing of the control statements used will be printed at the beginning of the REPORTS DD print file ahead of all other reports. The System Record Analysis report may not immediately follow these control statements.

Further limiting of the records documented in this report may be accomplished through the use of RAx options. See the heading, "PARM Options".

Limiting **DATA Analysis Report** when using with SRA Report

The above control statements are also used for limiting the DATA Analysis Report, *providing* **PARM** option (**DAS**ELECT) is also used. When used *without* the System Record Analysis Report, the control statement field for the record name may be used to select just a group name or an elementary dataname. Also, see the **UNR**EF **PARM** option for further limiting of the Data Analysis Report.

Selecting by **COPY Name** for System Record Analysis

Selecting 01 records for use in the System Record Analysis report may be done by using COPY member name. Simply specify the COPY member name and those COPYs which begin in the COPY immediately with an 01 will be selected. (Caution, if the COPY begins with other than an 01, such as an FD, it will be selected.) The end result is a full report on all SET, USED and TESTED activity (direct or indirect) on each field within COPY used throughout a system of COBOL programs.

The PARM option needed to invoke this feature is SRCOPY. The control statements have the following format:

Columns 1-7 - The constant SRCOPY= Columns
Columns 8-15 - The **COPY member name**

The DDNAME for inputting these control statements is the same CTLCDSRA used for other System Record Analysis control statements. It is possible to combine other control statements for these SRCOPY control statements. When this is done, the other control statements must come before the SRCOPY control statements.

When the SRCOPY option is used, both the COPY Analysis Report and System Record Analysis Report will be printed. The COPY Analysis Report will list all COPY members found in all programs. The System Record Analysis Report will list only those records selected by the control statements submitted with the CTLCDSRA DDNAME.

See Examples for 'System Record Analysis Reports' on *next* page

Example 1:

```
//STEP1     EXEC     DCDCOBOL,OTHER='SRCOPY'
//DCD.COBOLIN    DD   DSN=user.cobol(prog1),DISP=SHR
//                DD   DSN=user.cobol(prog2),DISP=SHR
//DCD.COPYLIB    DD   DSN=user.copylib,DISP=SHR
//DCD.CTLCDSRA  DD   *
SRCOPY=MEMBER1
SRCOPY=MEMB333
/*
```

This example does not combine statement formats. This example selects all 01 records which have a COPY MEMBER1 or a COPY MEMB333 at the beginning of the record. The 01 record name may come immediately before the COPY or after the first (non-comment) entry within the COPY.

Example 2:

```
//STEP2     EXEC     DCDCOBOL,OTHER='SRCOPY'
//DCD.COBOLIN    DD   DSN=user.cobol(prog1),DISP=SHR
//                DD   DSN=user.cobol(prog2),DISP=SHR
//DCD.COPYLIB    DD   DSN=user.copylib,DISP=SHR
//DCD.CTLCDSRA  DD   *
-ALL-  USER-RECORD-25
SRCOPY=MEMB5
/*
```

This example combines control statement formats by selecting all 01 records for USER-RECORD-25 and also all 01 records which have a COPY MEMB5.

Note - SRCOPY= control statements will be ignored by DCD IV if the PARM option SRCOPY is not turned on.

Control Statements for Literal Tracing

The Tracing of Literals reports *(3 individual reports are listed at bottom of page)* require control statements specifying which COBOL data fields are to be traced. Additionally, options DRL, DRF or DRC must be specified stating which reports are to be run. See 'PARM options' in this section or at the bottom of this page for specifying one of these options. Also, this report is formatted for, and limited to only one program at a time. Extra programs will be ignored.

Control statements are specified with the DD name CTLCDDLT. COBOL fields to be traced are entered starting in column 1. Multiple statements must be provided for multiple COBOL fields. If qualification is necessary to clarify a field, enter a Q, one space, then a group or record name as a qualifier control statement ahead of the COBOL field being selected. For instance, if duplicate names ACCT exist in group or record names FIELD-1 and FIELD-2, then qualification control statements for FIELD-1 or FIELD-2 must be used ahead of the field to be selected. To select ACCT OF FIELD-1 enter control statements as follows:

```
//DCD.CTLCDDLT   DD   *
Q FIELD-1
ACCT
/*
```

If more than one level of qualification is required, enter multiple qualification statements (statements beginning with a Q) ahead of the COBOL field name control statement. Put the 01 Record Name or Group Name having the lowest level number first (01 being lowest) when specifying qualification control statements.

Up to **17** levels of tracing are accomplished by tracking literals through **MOVEs** and **SET 88**-level-name **TO TRUE** statements. To limit the number of tracing levels to less than 17, modify the PARM field within the DCD step of the DCDSYSTM PROC to include 'DLT=nn' where nn is a number from 01 to 17.

A maximum of 1000 control statements are allowed. Much less are recommended. One COBOL program at a time may be processed.

PARM options are specified with the OTHER PROC symbolic. A sample is shown:

OTHER='DRC,DLT=06'

Three reports are available:

1. **Possible literals for each field traced** (Use option **DRF** for just report 1)
2. **Possible literals showing owner fields** (Use option **DRL** for reports 1 & 2)
3. **Possible literals showing possible paths** (Use option **DRC** for all 3 reports)

Control Statements for Layouts

The running of Layout Reports does not specifically require the use of control statements. However, control statements may be used to limit the selection of records for Layout Reports to selected record names or selected sizes.

Two types of control statements are available, but only one type (not both) may be used within one run. The DD name for these control statements is CTLCDLAY.

One way that control statements may be used is to specify by record name (or group name within an 01 record) the records or groups that Layout Reports are to be run for. (In the case of group names, the field positions in the Layout Reports will be relative to the start of the 01 record as opposed to the start of the group field, however the first field position in the group field may be reset to one by specifying an asterisk (*) after the group field in the control statement.)

The format of this type of control statement is as follows:

Column	1 through ?	-	01 record name (or 02-48 level group name)
Column	?+1	-	SPACE
Column	?+2	-	Optional Asterisk for group names that need to be reset

An example follows:

```
//DCD.CTLCDLAY   DD  *
MR-RECORD-1
MR-RECORD-2
MR-GROUP-FIELD-3  *
/*
```

In the above example, the first two control statements indicate selection of two 01 record names. The third control statement indicates the selection of a group field within an 01 record and the from-to positions within the group field will be reset starting at 1 for this group.

Another type of control statement allows selection to be limited by not printing Layout Reports for records smaller than a given record length and/or larger than a given record length. Within these control statements is the ability to print just records which have a specific record length. In the case of variable length records for determining size, the largest record length applies.

The format of this type of control statement is as follows:

Columns	1 through 6	-	The constant (SELECT)
Column	7	-	The character >, < or =
Column	8 through x	-	A numeric number with no punctuation

Only two control statements are allowed. One with SELECT< and one with SELECT>. Both are not required if one is used. If SELECT= is used, then only that control statement is allowed.

An example follows:

```
//DCD.CTLCDLAY   DD   *
SELECT>25
SELECT<1000
/*
```

In the above example, Layout Reports will not be produced for small records that are 25 characters or under in length. They will also not be printed for records that are 1000 characters or over in length.

Control Statements for Verb Analysis

The running of the Verb Analysis report does not require the use of control statements. However, control statement(s) may be used to allow printing of selected verbs. Up to 10 control statements are allowed. The field in the control statement is also limited to 10 characters.

An example follows:

```
//DCD.CTLCDVER   DD   *
ALTER
CASE   GO   TO
EXIT  PROGM
GO TO
PERFORM
STOP   RUN
/*
```

Most verbs should be coded with one verb with no spaces. Those which require spaces like ‘CASE GO TO’ are shown above.

Control Statements for Using the MBRFETCH PROC

The PDS Member Fetcher PROC MBRFETCH is available for pulling one or several members from a partitioned data set (PDS) and creating one sequential data set. This data set may be used as input to the DCDCOBOL PROC. (This PROC is also embedded as one step in the DCDJCL PROC which is covered in the section on JCL PROC Analysis Reports Facility.)

The DD name for these control statements is CTLCDMBR.

Control statements are used to indicate which members are to be selected. The format of these control statements is as follows:

Columns	1 through 4	-The constant (INDD)
Column	5	- An equal sign (=)
Columns	6 through *a*	- The name of a made-up DDNAME
Column	*a*+1	- An equal sign (=) with no spaces before or after it.
Columns	*b* through *c*	- One of the following words: 1. ALL 2. COBOL 3. COBRECS 4. MEMBER 5. PREFIX

The remaining two fields are required if PREFIX was used as the last operand and are optional if COBOL or COBRECS was used as the last operand. They are not permitted if either ALL or MEMBER is used as an operand.

Column	*c*+1	-An equal sign (=) with no spaces before or after it.
Columns	*d* through *e*	-A 1 to 7 characters prefix which will be used to limit selection

An illustration of the possible combinations is listed below:

1. INDD=ddname=ALL
2. INDD=ddname=COBOL
3. INDD=ddname=COBRECS
4. INDD=ddname=MEMBER
5. INDD=ddname=PREFIX=prefix
6. INDD=ddname=COBOL=prefix
7. INDD=ddname=COBRECS=prefix

An example showing the use of these control statements is listed below:

```
//STEP1      EXEC    MBRFETCH
//MBR.OUTSET       DD  DCB=(LRECL=80,BLKSIZE=3120)
//MBR.CTLCDMBR  DD   *
INDD=USERDD=COBOL
//MBR.USERDD       DD   DSN=USER.COBOL.LIBRARY,DISP=SHR
```

The above example will pull off all COBOL programs from the library specified by the DD name USERDD and pass them out to a sequential data set.

If members are wanted from more than one library, then multiple DD names may be used. An example is listed below:

```
//STEP2      EXEC    MBRFETCH
//MBR.OUTSET       DD  DCB=(LRECL=80,BLKSIZE=3120)
//MBR.CTLCDMBR  DD   *
INDD=USERDD=COBOL
INDD=OTHERDD=COBOL
//MBR.USERDD       DD   DSN=USER.COBOL.LIBRARY,DISP=SHR
//MBR.OTHERDD      DD   DSN=USER.COBOL.LIBRARY,DISP=SHR
```

The use of the following words for selection is described here:

ALL **COBRECS** **MEMBER**
COBOL **COBRECS=PREFIX** **PREFIX**
COBOL=PREFIX

ALL ALL indicates that all members will be selected from the partitioned data set. This option should not be used here. Instead, the options COBOL or COBRECS should be used. An exception to this rule occurs when using the READPDS option, in which case, ALL may be used and COBOL and COBRECS may not be used.

COBOL COBOL indicates that all COBOL programs are to be pulled off of the partitioned data set. If non-COBOL programs are found, then they are discarded.

COBRECS COBRECS indicates that all COPY members which are 01 records or record groups beginning with a level number (02-48) are to be pulled off of the PDS. Those members that do not conform to this selection are bypassed for selection. COBRECS may be used when the LOR option is used.

MEMBER MEMBER indicates that the user wants to make further selection with member name control statements. These control statements immediately follow the control statement which contains the word MEMBER. An example is listed below:

```
//STEP3      EXEC    MBRFETCH
//MBR.CTLCDMBR  DD   *
INDD=USERDD=MEMBER
MEMBER1
MEMBER2
MEMB03
MEMBER04
//MBR.USERDD       DD   DSN=USER.PDS,DISP=SHR
```

PREFIX PREFIX indicates that selection is to be done strictly on the basis of a 1 to 7 character prefix that follows the (=) sign after the word PREFIX. It is recommended that this option not be used here and that **COBOL=prefix** or **COBRECS=prefix** be used in its place. Prefix is described more on the next page.

Three ways to use PREFIX follow:

COBOL=prefix pulls off all COBOL programs from the PDS specified that begins with the same letters that are specified in the prefix. The prefix may not exceed seven characters in length.

COBRECS=prefix pulls off all COPY members that have as their first COBOL record, a level number from (01-48) that have a matching prefix. This is used when using PARM option LOR for LAYOUTS.

PREFIX=prefix pulls off all members that have a matching prefix.

An example follows:

```
//STEP4    EXEC     MBRFETCH
//MBR.OUTSET        DD   DCB=(LRECL=80,BLKSIZE=3120)
//MBR.CTLCDMBR   DD   *
INDD=USERDD=COBOL=M4
//MBR.USERDD        DD   DSN=USER.COBOL.LIBRARY,DISP=SHR
```

In the above example, all COBOL programs whose member name begins with the prefix M4 will be selected for passing on to the next step.

See the heading, “JCL Examples”, for an example of combining this PROC with the DCDCOBOL PROC.

Further notes on the member fetcher:

1. Compressing the PDS before using the data set will eliminate the possibility of pulling in older unwanted members from the PDS.
2. Multiple control statements may be used for any of the above formats.
3. To prevent obtaining duplicate members, do not mix formats in the same run.

Control Statements for CALL Hierarchy Report

Read this page completely before setting up to use the CALL Hierarchy Report.

This report produces one or several reports showing top down the CALL Hierarchy for those COBOL programs processed. Within each program the order of CALLs is shown in alphabetical order. These reports may be modified by ADD or DELETE controls statements. The ADD and DELETE commands must be entered one per line. Columns 73-80 are not used. Use spaces to separate the operands. Do not use the single apostrophes or double quotes. Up to 500 control statements may be used.

To add a CALL to the Hierarchy Report, use the following format:

ADD program-a CALLS program-b

To delete a CALL from the Hierarchy Report, use the following format:

DELETE program-b

DELETE pr* (where * indicates that only the characters before the asterisk will be used in making the comparison, and those not compared are considered to be equal for matching)

An example of the use of these control statements is shown below:

```
//DCD.CTLCDCAH  DD   *
ADD  SUB1P003  CALLS  SUB3P091
DELETE  SUB6P*
DELETE  SUB9P*
/*
```

The CALL Hierarchy Report produces counts showing the number of CALLs present. These counts are valid for all STATIC CALLs and for those DYNAMIC CALLs which use the 'CALL literal' format. When the 'CALL identifier' format is used, multiple CALLs are counted as one call. CALL identifier specifies a dataname, which contains a literal. DCD IV builds one CALL for each literal contained in an elementary VALUE clause and/or with the MOVEs of a literal to this name. In cases where the identifier is built over several MOVEs or VALUE clauses of a group field, then an ADD control statement must be used for each CALL that is missing.

This report works with all the CALLs (and ENTRYs) found within the programs submitted to DCD IV. The ENTRY verb (when present) plays a part in determining the CALL Hierarchy only when the program that CALLs a secondary program with the ENTRY verb was not submitted for processing to DCD IV. For example, if PROG-A calls an Assembler program PROG-B, which in turn calls PROG-C where PROG-C contains an ENTRY 'PROG-B', then the CALL 'PROG-B' within PROG-A and the ENTRY 'PROG-B' within PROG-C provides all the information to complete the CALL from PROG-A to PROG-C even though Assembler program PROG-B could not be processed by DCD IV. In cases where the ENTRY verb is not used (i.e. - the entry is done via PROCEDURE DIVISION USING **...** within the sub-program) and the calling program is missing or cannot be processed by DCD IV because it is non-COBOL, then ADD control statements must be used to complete the Hierarchy Report. (i.e. ADD PROG-B CALLS PROG-C)

Control Statements for Tracing & Analysis

Two types of control statements are available for Tracing & Analysis. The first type is **SELECT**ion control statements and these are mandatory to state which fields are to be selected for the report. The second type is **BYPASS**ing and is optional and may be used to break a trace invoked by tracing option YAP.

This report is applicable to any maintenance work done in COBOL for the purpose of tracing how any one data field is used in a COBOL program. There is a limit of one program at a time for this report. Extra programs will be ignored.

SELECT Control Statements

The DD name of the control file for SELECT statements is SELECT. There is a limit of 250 SELECTs, which may be used in any one run. See **TRACE** and **'Tracing & Analysis Supporting Options'** in the PARM section. Also see **'Tracing & Analysis Report'** under '**Overview of All Reports including Tracing & Analysis'**.

There are two formats for SELECTs. Use the first format if you know the name or names to be selected. Use the second format to select by different criteria. If both formats are used together, then all Format#2 SELECTs ***must come before*** any Format#1 SELECTs. The following rules apply to both SELECT formats. The word SELECT must start in columns 1 to 12. Columns 73-80 are not used. Leave one or more spaces between each entry.

Format#1

user-supplied-name

OR

SELECT IF NAME = user-supplied-name

In case of duplicate names where only 1 name is wanted then use the following format, and fill in the appropriate 01 record name where shown. Using a **GROUP name will NOT substitute** for the 01 record name. If further qualification is required, then invoke **Format#2** by adding an AND in the SELECT using START-POSITION (or other) keyword to complete the selection with or without the **OF 01-record-name** shown below.

SELECT IF NAME = user-supplied-name **OF 01-record-name**

Format#2

```
SELECT  IF  keyword  operator   selection-field
                     [  OR      selection-field    ] . . .
    [ AND   keyword  operator   selection-field
                     [  OR      selection-field    ] . . .  ] . . .
```

The following rules apply to this SELECT format. The brackets [ ] and ellipses ... in the above format are not to be coded however are there to show the allowance of **multiple ORs** and **multiple ANDs** with multiple ORs within the ANDs. The SELECT statement may be continued on to several lines. **Lower case** entries within the SELECT must be replaced with a **user entry** as follows:

keyword	replace with one of the keywords shown on the KEYWORD list. Within ANY one SELECT, the same keyword may be used once unless operators < and > are used. Use **AND** as a separator to start a new keyword.
operator	Use = unless the KEYWORD chosen allows the operators < and >.
selection-field	Do not use quotes or apostrophes. Enter the selection field as one entry with no embedded spaces. An asterisk (*) may be used as a wild string if the KEYWORD chosen allows them. The size of the selection-field must not exceed the maximum size allowed for that KEYWORD. Multiple selection-fields may be used by separating them with the word **OR**.

Consider using PARM option **YTEST** to test all **Format#2** SELECTs before producing a report.

If the user wants to select a field, which has certain characteristics, the following 18 KEYWORDs are provided for finding field which have the selection criteria provided:

#	keyword	operators allowed	maximum length	for selecting on	Comments
1.	PREFIX	=	20	Data-Name	For selecting by begin of Name
2.	SUFFIX	=	20	Data-Name	For selecting by end of Name
3.	BEGIN-NODE	=	20	Data-Name	For selecting by begin of Node*
4.	END-NODE	=	20	Data-Name	For selection by end of Node*
5.	NODE-1	=	20	Data-Name	Wild Strings Allowed, selects from any Node*
6.	NODE-2	=	20	Data-Name	Wild Strings Allowed, selects from any Node*
7.	PICTURE	=	20	PICTURE	Use ORs to select different combinations
8.	LEVEL-NUMBER	=	02	Level Numbers	Use ORs to select different level numbers
9.	WHOLE-DIGITS	=	02	Coded Numeric Size	Selects by # of digits on left of decimal place
10.	DECIMAL-DIGITS	=	02	Coded Numeric Size	Selects by # of digits on right of decimal place
11.	START-POSITION	=, >, <	07	Position in record	May use two START-POSITION keywords separated by AND, 1 using > and 1 using <
12.	END-POSITION	=, >, <	07	Position in record	May use two keywords; one >, and one <
13.	FIELD-SIZE	=, >, <	07	Actual Size of Field	May use two keywords, one >, and one <
14.	GROUP-ONLY	=	01	GROUP fields	Use **Y** to select only GROUP fields
15.	ELEMENTARY-ONLY	=	01	ELEMENTARY fields	Use **Y** to select only ELEMENTARY fields
16.	SECTION	=	01	SECTION	Use first letter of SECTION as follows: (**F**=FILE, **W**=WORKING-STORAGE, **L**=LINKAGE, **R**=REPORT, **C**=COMMUNICATION)
17.	USAGE	=	02	USAGE	Use two letters for USAGE as follows: (**D**=DISPLAY, **D1**=DISPLAY-1, **C**=COMP, **C1**=COMP-1, **C2**=COMP-2, **C3**=COMP-3, **C4**=COMP-4, **IX**=INDEX)
18.	CLASS	=	01	CLASS	Use one letter for CLASS as follows: (**N**=Numeric **X**=Alphabetic or Alphanumeric, **E**=Numeric Edited)
19.	NAME	=	30	NAME	(OF 01-record-name) optional after data-name

Table of KEYWORDs for use with free-format SELECT

The most commonly used keywords are those which SELECT on some part of the data-name. Consider using more than one of the first six KEYWORDs in one SELECT separated by ANDs to develop a very powerful selection capability for finding data-names. Four of these six keywords start selection at the **beginning** of a node or data-name and the other two SUFFIX and END-NODE start selection at the **end** of a node or data-name). For NODE-1 and NODE-2, an * may be used after one or more letters in the selection field as a wild string, providing another letter or letters are used following the *. When used, the * indicates that any number from 0 to 18 characters (non-dashes) may be present before picking up selection with the next character. Consider using NODE-1 and NODE-2 together with Wild Strings in one or both PREFIXs. Consider completing selection with one or more non-data-name keywords being ANDed to those used for selecting by data-name.

When selecting by field size, there is a difference, which may be used to an advantage when doing selection. WHOLE-DIGITS and DECIMAL-DIGITS work with NUMERIC fields and work with the size coded in the PICTURE clause, while FIELD-SIZE works with the actual number of bytes that the field occupies within a record. (e.g - 05 TEST-FLD S9(9) COMP-3. takes up 5 bytes in FIELD-SIZE, but has 9 WHOLE-DIGITS in the field)

See Example 10 under '**JCL Examples**' in this section, for an example of JCL to use this feature.

*** Node** *is defined as a cluster of characters in name separated by dashes.*

BYPASS Control Statements

After the first run of Selecting Names, it is possible to have TRACED names (names traced with the use of PARM option YAP) which may not actually be in a valid functioning program path. For example, a date in an 01 record HEADING-1 may accurately trace to a related 01 record PRINT-RECORD, but can inaccurately trace to other 01 records HEADING-2 and DETAIL-RECORD. As a simple means of stopping the trace into and through HEADING-2 and DETAIL-RECORD, bypass control statements should be provided using Format#1 (01-record-name) or in other cases using Format#2 below.

The DD name of the control file for BYPASS statements is BYPASS. Only columns 1-30 may be in BYPASS control statements. **RANGE control statements only use columns 1-17.**

There are three formats for BYPASS control statements. They follow:

Format#1

Columns 1-30

01-record-name — Specifies an 01 record **WHICH IS NOT** implicitly or explicitly **REDEFINE**d. When used, all names belonging to this record AND it's redefined (implicit or explicit) 01 records will be BYPASSed.

Format#2

Columns 1-30

data-name — Specifies a COBOL elementary, group, 88 name, or other data division name, which is to by BYPASSed.

Format#3

Columns 1-17

RANGE=nnnnn-nnnnn — Specifies a range of sequence number. Each nnnnn **MUST BE** 5 digits. The first nnnnn specifies a BEGIN program sequence number. The second nnnnn specified an END program sequence number. These sequence numbers are determined AFTER COPY members are expanded. To be safe, use sequence numbers from the 'Alternate Compile Listing' for the program submitted.

Warning - Do not use **RANGE=** when multiple programs are used. If RANGE is used and the program is modified, then the RANGE will change and need to be modified.

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JCL Examples

The examples within this heading use one of three DCD IV PROCs. These three PROCs are:

1. **PANCOBOL**
2. **LIBCOBOL**
3. **DCDCOBOL**

Within each of the examples, capitalized letters should be left coded as shown, and non-capitalized letters require the user to enter in the names or entries required to complete the JCL.

Some of the examples using the DCDCOBOL PROC also use the **MBRFETCH** PROC. For WRITPDS and READPDS options, see the heading for "**WRITPDS and READPDS Options**".

Example 1

Print the System Paragraph Cross Reference and System Data Name Cross Reference Reports from three programs residing on a Panvalet library.

```
//STEP1     EXEC   PANCOBOL,SRCLIB='panvalet.library',
//          PARA=,DATA=
//PAN.SYSIN      DD   *
++WRITE WORK,prog1
++WRITE WORK,prog2
++WRITE WORK,prog3
//DCD.COPYLIB DD   DSN=user.copy.library,DISP=SHR
```

Note: The COPYLIB DD is added assuming that there may be COPY members on some of the Panvalet stored programs.

Example 2

Print the CALL Analysis, COPY Analysis and Verb Analysis Reports from two programs residing on a Librarian library.

```
//STEP2     EXEC   LIBCOBOL,SRCLIB='librarian.lib',
//          CALL=,COPY=,VERB=
//LIB.SYSIN      DD   *
-OPT EXEC
-SEL prog1,pswd
-EMOD
-SEL prog2,pswd
-EMOD
-END
//DCD.COPYLIB DD   DSN=user.copy.library,DISP=SHR
```

Note: The COPYLIB DD is added assuming there may be COPY members on some of the Librarian stored programs.

Example 3

Print the System Cross Reference for Literals, 01 Record Report and Layout Report from four programs residing on a partitioned data set.

```
//STEP3    EXEC   DCDCOBOL,OTHER='LIT',RECORDS=,LAYOUT=
//DCD.COBOLIN     DD   DSN=user.cobol.library (prog1),DISP=SHR
//                DD   DSN=user.cobol.library (prog2),DISP=SHR
//                DD   DSN=user.cobol.library (prog3),DISP=SHR
//                DD   DSN=user.cobol.library (prog4),DISP=SHR
//DCD.COPYLIB     DD   DSN=user.copy.library,DISP=SHR
```

Example 4

Print the 01 Record and Layout Reports from all COBOL programs residing on a partitioned data set whose member names begin with the prefix PAYR or PAYM.

```
//STEP4A   EXEC   MBRFETCH
//MBR.OUTSET      DD   DCB=(LRECL=80,BLKSIZE=3120)
INDD=USERDD=COBOL=PAYR
INDD=USERDD=COBOL=PAYM
//MBR.USERDD      DD   DSN=user.cobol.library,DISP=SHR
//*
//STEP4B   EXEC   DCDCOBOL,RECORDS=,LAYOUT=
//DCD.COBOLIN     DD   DSN=&&PASSFILE,DISP=(OLD,PASS)
//DCD.COPYLIB     DD   DSN=user.copy.library,DISP=SHR
```

Note: The PDS Member Fetcher PROC is discussed under the headings, "**Choice of DCD IV PROCs**" and "**Control Statements for Using the MBRFETCH PROC**".

Example 5

Print the System Record Analysis Report on two sets of records.

```
//STEP5    EXEC   DCDCOBOL,SRA=
//DCD.COBOLIN     DD   DSN=user.cobol.library (prog1),DISP=SHR
//                DD   DSN=user.cobol.library (prog2),DISP=SHR
//                DD   DSN=user.cobol.library (prog3),DISP=SHR
//DCD.COPYLIB     DD   DSN=user.copy.library,DISP=SHR
//DCD.CTLCDSRA    DD   *
*title for report 1
-ALL-  mr-record-1
-ALL-  ms-record-1
prog3 ms-record-4
*title for the second report
prog2  184
/*
```

Notes:

- In the first report, 2 records are selected from ALL programs along with a record from prog3.
- In the second report, all records in prog2 which have an overall length of 184 will be used.

Example 6

Produce a Data Dictionary Interface File on all records 240 characters in length.

```
//STEP6A    EXEC    DCDCOBOL,OTHER=DICT
//DCD.DCDDICT    DD   DSN=user.file,DISP=(,KEEP),
//            VOL=SER=userpk,UNIT=SYSDA,SPACE=(CYL, (2,20) ),
//            DCB=(RECFM=FB,LRECL=120,BLKSIZE=3120)
//DCD.COBOLIN    DD   DSN=user.cobol.library (prog1),DISP=SHR
//DCD.COPYLIB    DD   DSN=user.copy.library,DISP=SHR
//DCD.CTLCDSRA  DD   *
*set number 1
prog1 240
/*
```

Example 7

Print Layout Reports for selected records from a given program.

```
//STEP7      EXEC    DCDCOBOL,LAYOUT=
//DCD.COBOLIN    DD   DSN=user.cobol.library (prog1),DISP=SHR
//DCD.COPYLIB    DD   DSN=user.copy.library,DISP=SHR
//DCD.CTLCDLAY  DD   *
ms-record-1
ms-record-2
/*
```

Example 8

Print Layout Reports for all records which have a record size from 220 to 240 characters in length.

```
//STEP8     EXEC     DCDCOBOL,LAYOUT=
//DCD.COBOLIN    DD   DSN=user.cobol.library(prog1),DISP=SHR
//                    DD   DSN=user.cobol.library(prog2),DISP=SHR
//DCD.COPYLIB    DD   DSN=user.copy.library,DISP=SHR
//DCD.CTLCDLAY  DD   *
SELECT>219
SELECT<241
/*
```

Example 9

Bring just 01 records into DCD IV (not a COBOL program) and print Layout Reports.

```
//STEP9A    EXEC   MBRFETCH
//MBR.OUTSET      DD   DCB=(LRECL=80,BLKSIZE=3120)
//MBR.CTLCDMBR  DD   *
INDD=USERDD=COBRECS
//MBR.USERDD       DD   DSN=user.copy.library,DISP=SHR
//*
//STEP9B    EXEC   DCDCOBOL,LAYOUT=,OTHER=LOR
//DCD.COBOLIN      DD   DSN=&&PASSFILE,DISP=(OLD,PASS)
```

Notes:

- See "**Control Statements for Using the MBRFETCH PROC**"
- All COPY members that do not begin an 01 record or (02-48) level group are bypassed
- With option LOR option indicating records (not COBOL programs), no other reports are allowed

For Examples 10 and 11, see "**Tracing & Analysis Report**" under "**Overview of All Reports including Tracing & Analysis**" in this section.

Example 10

Produce a report using the Tracing & Analysis feature.

```
//STEP10     EXEC    DCDCOBOL,TRACE=,OTHER=NOYIN
//DCD.COBOLIN       DD  DSN=user.cobol.library(prog1),DISP=SHR
//DCD.COPYLIB       DD  DSN=user.copy.library,DISP=SHR
//DCD.SELECT        DD  *
   SELECT  IF  NODE-1       =  P*R
           AND  NODE-2      =  Y*R  OR  YE
           AND  FIELD-SIZE  =  2
//DCD.BYPASS        DD  *
HEADING-1-RECORD
DETAIL-RECORD
```

Notes:

- The SELECT looks for a node with PAYROLL, PR or other combinations and then looks for another node with YEAR, YR, YE or other combinations, and then looks for a field which is two bytes long.
- The optional BYPASS DD is used to stop the TRACE for 01 records HEADING-1-RECORD and DETAIL-RECORD
- The option to also produce PROCEDURE DIVISION Narrative is turned off

Example 11

Produce a report using the Tracing & Analysis feature.

```
//STEP11     EXEC    DCDCOBOL,TRACE=
//DCD.COBOLIN       DD  DSN=user.cobol.library(prog1),DISP=SHR
//DCD.COPYLIB       DD  DSN=user.copy.library,DISP=SHR
//DCD.SELECT        DD  *
  PAYROLL-MONTH
```

Notes:

- The SELECT simply looks for the name shown (PAYROLL-MONTH)

JCL to Execute DCD IV without Using PROCs

The JCL necessary to execute the DCDSYSTM program for use with the features in this section is listed here and is informational. It is recommended however, that PROCs be used for the actual execution of DCD IV. The rest of this section is designed for use of the PROCs shown in this section.

```
//DCD      EXEC   PGM=DCDSYSTM, REGION=8192K,
//         PARM=(options)
//*
//STEPLIB      DD     DSN=user.loadlib,DISP=SHR
//*
//DCDWK01      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK02      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK03      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK04      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK05      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK06      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK07      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK08      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK09      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK10      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK11      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK12      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//*
//DCDWKS1      DD     UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS2      DD     UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS3      DD     UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS4      DD     UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS5      DD     UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS6      DD     UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS7      DD     UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//*
//DCDWKT1      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT2      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT3      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT4      DD     UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//*
//PRINT        DD     SYSOUT=*,DCB=BLKSIZE=133
//REPORTS      DD     SYSOUT=*,DCB=BLKSIZE=133
//*
//SYSOUT       DD     SYSOUT=*,DCB=BLKSIZE=121
//SORTMESS     DD     SYSOUT=*,DCB=BLKSIZE=133
//SORTLIB      DD     DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01     DD     UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK02     DD     UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK03     DD     UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//*
//CONTROL      DD     DSN=user.pds(DCDCNTRL),DISP=SHR
//*
```

See the next page for additional DD statements.

Extra DD statements may be required in addition to those shown on the previous page. These additional DD statements are listed below:

BYPASS - optionally used to stop tracing levels by BYPASSing a record or field in the Tracing & Analysis report. See the heading '**Control Statements for Tracing & Analysis**'.

COBOLIN - required unless PARM option READPDS is used without using WRITPDS at the same time. Points to a COBOL program, several COBOL programs or one or more COBOL records when producing only Layout Reports using the LOR option.

COPYLIB - required if COPY members are present in the COBOL program

CTLCDCAH- optionally used to modify the CALL Hierarchy Report.

CTLCDDLT - used to provide data names for use in the Tracing Literals Report.

CTLCDLAY - optionally used if the LAYOUTS PARM option is used and further selection is wanted through control statements. See the heading, '**Control Statements for Layouts**'.

CTLCDMBR- see 'MBRFETCH Extra DD Statements …' below.

CTLCDSRA - required when either the SRA or DICT PARM option is used. See the heading, '**Control Statements for System Record Analysis**'.

CTLCDVER - optionally used to select by verb in the VERB Analysis Report.

DCDPDS - required if the WRITPDS option is used. See the heading, '**WRITPDS and READPDS Options**'.

DCDREPDS - required if the READPDS option is used. See the heading, '**WRITPDS and READPDS Options**'.

SELECT - required to select fields for the Tracing & Analysis report. See the heading '**Control Statements for Tracing & Analysis**'.

The REGION is set to 8192K. Consult the Installation Instructions for Guidelines on REGION size.

The DCB=BUFNO is set to 5 for MVS.

See Installation Instructions for information on the CONTROL DD.

JCL for the PDS member fetcher PROC is shown below:

```
//MBR        EXEC   PGM=MBRFETCH,REGION=512K
//SYSPRINT   DD     SYSOUT=*
//WORKFILE   DD     UNIT=SYSDA,SPACE=(TRK,(4,2))
//OUTSET     DD     DSN=&&PASSFILE,DISP=(,PASS),UNIT=SYSDA
//          SPACE=(CYL,(5,10)),DCB=(LRECL=80,BLKSIZE=3120)
```

MBRFETCH Extra DD statements are listed here:

CTLCDMBR - required and used to input control to this PROC. See the heading '**Control Statements for Using the MBRFETCH PROC**'.

userdd - one or more DDnames that are user specified are required if the above CTLCDMBR DD is used.

PROCs Provided for Use in This Section

Four PROCs are provided. They are listed here and are shown on the next pages. If Panvalet or Librarian are not used in your shop, then PROCs PANCOBOL or LIBCOBOL may be ignored.

1. **PANCOBOL** - Running DCD IV with input from Panvalet

2. **LIBCOBOL** - Running DCD IV with input from Librarian

3. **DCDCOBOL** - Running DCD IV without Panvalet or Librarian

4. **MBRFETCH** - Used with PROC DCDCOBOL for selecting COBOL programs or COPY records by means of control statements from partitioned data sets.

```
//PANCOBOL  PROC  CALL=NO,                  * CALL ANALYSIS        REPORT
//                COPY=NO,                  * COPY ANALYSIS        REPORT
//                DATA=NO,                  * DATA ANALYSIS        REPORT
//                LAYOUT=NO,                * LAYOUTS
//                PARA=NO,                  * PARAGRAPH            REPORT
//                RECORDS=NO,               * 01 RECORDS           REPORT
//                SRA=NO,                   * SYSTEM  RECORD  ANALYSIS
//                TRACE=NO,                 * TRACING & ANALYSIS
//                RESOLVE=,                 * RESOLVE COPY MEMBERS
//*      USE XXX= ABOVE TO TURN ON A REPORT OR OPTION
//                OTHER=' ,' ,              * USED TO ENTER OTHER PARM OPTIONS
//                LINECNT=60,               * NUMBER OF LINES PER PAGE
//                SRCLIB='PANVALET.SOURCE',
//                BUF=5,                    * USE  BUF=5
//                PRINT='*',                *  SEND  PRINT  OUTPUT  TO  MSGCLASS
//                REG=8192K,                * REGION  SIZE
//                SORTREG=600000,           * SORT  REGION
//                WORK=SYSDA                * UNIT=SYSDA,  DISK  OR  OTHER
//*    PROC  TO  RUN  THE  SYSTEM  REPORTS  WITHIN  DCD IV
//*   MARBLE  COMPUTER,  INC.  1-800-252-1400   PROC=PANCOBOL    REL 4.0
//*                                                                LM090112
//PAN       EXEC      PGM=PAN#1
//*    INSERT  STEPLIB  HERE  IF  NECESSARY
//SYSPRINT          DD   SYSOUT=&PRINT
//PANDD1            DD   DSN=&SRCLIB,DISP=SHR
//PANDD2            DD   DSN=&&TEMP,DCB=BLKSIZE=6160,UNIT=&WORK,
//                       DISP=(,PASS),SPACE= (CYL,(2,20))
//*
//DCD       EXEC      PGM=DCDSYSTM,REGION=&REG,
//             PARM=(&CALL.CAL,&COPY.COP,&DATA.DAT,
//                   &LAYOUT.LAY,&PARA.PAR,&RECORDS.REC,
//                   &SRA.SRA,&TRACE.TRA,&RESOLVE=RES,
//                   &OTHER,'SOR=&SORTREG','LNC=&LINECNT')
//*    INSERT  STEPLIB  HERE  IF  NECESSARY
//CONTROL           DD   DSN=USER.PDS (DCDCNTRL),DISP=SHR
//COBOLIN           DD   DSN=&&TEMP,DISP=(OLD,DELETE)
//*    INSERT  COPYLIB  HERE  IF  NECESSARY
//DCDWK01           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK02           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK03           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK04           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK05           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK06           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK07           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK08           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK09           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK10           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK11           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK12           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKS1           DD   UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS2           DD   UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS3           DD   UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS4           DD   UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS5           DD   UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS6           DD   UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKT1           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT2           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT3           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT4           DD   UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//PRINT             DD   SYSOUT=*,DCB=BLKSIZE=133
//REPORTS           DD   SYSOUT=*,DCB=BLKSIZE=133
//SYSOUT            DD   DUMMY,DCB=BLKSIZE=121
//SORTMESS          DD   DUMMY,DCB=BLKSIZE=133
//SORTLIB           DD   DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01          DD   UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK02          DD   UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK03          DD   UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
```

Exhibit 1
PANCOBOL PROC

```
//LIBCOBOL  PROC CALL=NO,        * CALL ANALYSIS        REPORT
//                 COPY=NO,      * COPY ANALYSIS        REPORT
//                 DATA=NO,      * DATA ANALYSIS        REPORT
//                 LAYOUT=NO,    * LAYOUTS
//                 PARA=NO,      * PARAGRAPH            REPORT
//                 RECORDS=NO,   * 01 RECORDS           REPORT
//                 SRA=NO,       * SYSTEM RECORD ANALYSIS
//                 TRACE=NO,     * TRACING & ANALYSIS
//                 RESOLVE=,     * RESOLVE COPY MEMBERS
//*  USE  XXX=  ABOVE  TO  TURN  ON  A  REPORT  OR  OPTION
//                 OTHER=',',    * USED TO ENTER OTHER PARM OPTIONS
//                 LINECNT=60,   * NUMBER OF LINES PER PAGE
//                 SRCLIB='LIBRARAN.SOURCE' ,
//                 LIBPGM='LIBRARAN' ,
//                 BUF=5,        * USE BUF=5
//                 PRINT='*',    * SEND PRINT OUTPUT TO MSGCLASS
//                 REG=8192K,    * REGION SIZE
//                 SORTREG=600000, * SORT REGION
//                 WORK=SYSDA    * UNIT=SYSDA, DISK OR OTHER
//*    PROC  TO  RUN  THE  SYSTEM  REPORTS  WITHIN  DCD IV
//*  MARBLE  COMPUTER, INC.  1-800-252-1400  PROC=LIBCOBOL  REL  4.0
//*                                                          LM090112
//LIB      EXEC    PGM=&LIBPGM,PARM==NJTA,NRJS= CHECK LIBRARIAN PARMS
//*   INSERT  STEPLIB  HERE  IF  NECESSARY
//SYSPRINT       DD  SYSOUT=&PRINT
//LIST           DD  SYSOUT=&PRINT
//MASTER         DD  DSN=&SRCLIB,DISP=SHR
//OSJOB          DD  DSN=&&TEMP,DCB=BLKSIZE=6160,UNIT=&WORK,
//                   DISP=(,PASS),SPACE=(CYL,(2,20))
//DCD    EXEC    PGM=DCDSYSTM,REGION=&REG,
//            PARM=(&CALL.CAL,&COPY.COP,&DATA.DAT,
//                 &LAYOUT.LAY,&PARA.PAR,&RECORDS.REC,
//                 &SRA.SRA,&TRACE.TRA,&RESOLVE=RES,
//                 &OTHER,'SOR=&SORTREG','LNC=&LINECNT')
//*        INSERT  STEPLIB  HERE  IF  NECESSARY
//CONTROL        DD  DSN=USER.PDS(DCDCNTRL),DISP=SHR
//COBOLIN        DD  DSN=&&TEMP,DISP=(OLD,DELETE)
//*        INSERT  COPYLIB  HERE  IF  NECESSARY
//DCDWK01         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK02         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK03         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK04         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK05         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK06         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK07         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK08         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK09         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK10         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK11         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK12         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKS1         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS2         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS3         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS4         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS5         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS6         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS7         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKT1         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT2         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT3         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT4         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//PRINT          DD  SYSOUT=*,DCB=BLKSIZE=133
//REPORTS        DD  SYSOUT=*,DCB=BLKSIZE=133
//SYSOUT         DD  DUMMY=*,DCB=BLKSIZE=121
//SORTMESS       DD  DUMMY=*,DCB=BLKSIZE=133
//SORTLIB        DD  DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01       DD  UNIT=SYSDA,SPACE= (TRK,(100),,CONTIG)
//SORTWK02       DD  UNIT=SYSDA,SPACE= (TRK,(100),,CONTIG)
//SORTWK03       DD  UNIT=SYSDA,SPACE= (TRK,(100),,CONTIG)
```

Exhibit 2
LIBCOBOL PROC

```
//DCDCOBOL  PROC  CALL=NO,          * CALL  ANALYSIS      REPORT
//               COPY=NO,           * COPY  ANALYSIS      REPORT
//               DATA=NO,           * DATA  ANALYSIS      REPORT
//               LAYOUT=NO,         * LAYOUTS
//               PARA=NO,           * PARAGRAPH           REPORT
//               RECORDS=NO,        * 01  RECORDS         REPORT
//               SRA=NO,            * SYSTEM  RECORD ANALYSIS
//               TRACE=NO,          * TRACING & ANALYSIS
//*
//               RESOLVE=,          * RESOLVE COPY MEMBERS
//*   USE XXX=    ABOVE  TO  TURN  ON  A  REPORT  OR  OPTION
//               OTHER=‘,’,         * USED TO ENTER OTHER PARM OPTIONS
//               LINECNT=60,        * NUMBER OF LINES PER PAGE
//               BUF=5,             * USE  BUF=5
//               PRINT=‘*’,         * SEND  PRINT  OUTPUT  TO  MSGCLASS
//               REG=8192K,         * REGION SIZE
//               SORTREG=600000,    * SORT REGION
//               WORK=SYSDA         * UNIT=SYSDA,  DISK  OR  OTHER
//*  PROC  TO  RUN  THE  SYSTEM  REPORTS  WITHIN  DCD I V
//*  MARBLE  COMPUTER,  INC.  1-800-252-1400  PROC=DCDCOBOL  REL 4.0
//*                                                          LM090112
//DCD       EXEC    PGM=DCDSYSTM,REGION=&REG,
//     PARM= ( &CALL. CAL, &COPY. COP, &DATA. DAT,
//               &LAYOUT.LAY,&PARA.PAR,&RECORDS.REC,
//               &SRA. SRA, &TRACE. TRA, &RESOLVE=RES,
//               &OTHER,
//            'TAC=&TRLIMIT', ‘SOR=&SORTREG’,‘LNC=&LINECNT’)
//*     INSERT  STEPLIB  HERE  IF  NECESSARY
//CONTROL       DD     DSN=USER.PDS(DCDCNTRL) ,DISP=SHR
//*     INSERT  COPYLIB  HERE  IF  NECESSARY
//DCDWK01         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK02         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK03         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK04         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK05         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK06         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK07         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK08         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK09         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK10         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK11         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWK12         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKS1         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS2         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS3         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS4         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS5         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS6         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKS7         DD  UNIT=SYSDA,SPACE=(CYL,(2,20)),DCB=BUFNO=5
//DCDWKT1         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT2         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT3         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//DCDWKT4         DD  UNIT=SYSDA,SPACE=(CYL,(2,2)),DCB=BUFNO=5
//*
//PRINT           DD    SYSOUT=*,DCB=BLKSIZE=133
//REPORTS         DD    SYSOUT=*,DCB=BLKSIZE=133
//*
//SYSOUT          DD    DUMMY=*,DCB=BLKSIZE=121
//SORTMESS        DD    DUMMY=*,DCB=BLKSIZE=133
//SORTLIB         DD    DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01        DD    UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK02        DD    UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
//SORTWK03        DD    UNIT=SYSDA,SPACE=(TRK,(100),,CONTIG)
```

Exhibit 3
DCDCOBOL PROC

```
//MBRFETCH   PROC   PRINT='*',WORK=SYSDA
//MBR        EXEC   PGM=MBRFETCH,REGION=512K
//SYSPRINT     DD   SYSOUT=&PRINT
//WORKFILE     DD   UNIT=&WORK,SPACE=(TRK, (4,2))
//OUTSET       DD   DSN=&&PASSFILE,DISP=(,PASS),UNIT=&WORK,
//                  SPACE=(CYL,(5,10))
```

Exhibit 4
MBRFETCH PROC

Notes on MBRFETCH PROC

There are two uses for the MBRFETCH PROC within this section.

The first is for inputting COBOL programs. See 'Choice of DCDIV PROCs' use. The user is prompted to add the following DCB to the OUTSET DD as shown below:

DCB=(LRECL=80,BLKSIZE=3120)

The second is for using DCDIV's internal Data Dictionary. See "WRITPDS and READPDS' options in this section. When used here, the record size if specified must be 3120 as shown on the JCL example in the write-up on "WRITPDS and READPDS' options.

Efficient Use of Work Space

When large systems are put through the DCD IV system, questions may arise over the use of work file space. This heading makes an attempt to answer these questions.

DCD IV work files DCDWK01 through DCDWK07 are used for one program at a time and do not hold cumulative files from several programs at any one time. For this reason, the SPACE allocation for these files may be kept small (both primary and secondary allocation). The only exception to this rule occurs when a user attempts to run Layout Reports on several programs at once, in which case, DCDWK01 will hold all the Layout Reports produced prior to printing them.

DCD IV work files DCDWK08 through DCDWK12 are used mostly by the Tracing & Analysis Feature and may typically be kept small.

DCD IV work files DCDWKS1 through DCDWKS7 hold cumulative information in a condensed format for all programs run through DCD IV at any one time. The files, besides being in a condensed format where three or more occurrences of spaces or zeros are reduced to two characters, are further reduced by only holding the fields that are needed for the particular reports wanted. Further, most of the work files DCDWKS1 through DCDWKS7 are not used when just one or two reports are selected.

Because of the file structure used for files DCDWKS1 through DCDWKS7, the SPACE in the PROCs for these files have very small primary increments and very large secondary increments.

DCDWKT1 through DCDWKT4 are used for Direct Tracing of Literals invoked by PARM option DIT.

The following chart shows which options use which work files:

PARM field	WS1	WS2	WS3	WS4	WS5	WS6	WS7
CAHIER						YES	
CALL						YES	
COPY			YES				
DATA					YES		YES
FGCONSTS			YES				
LAYOUTS							YES
LITERALS			YES				
PARAGRAPH		YES					
RECORDS	YES						
SPREGS			YES				
SRANAL				YES			
VERB		YES				YES	

The DDNAME DCDPDS which is used when the WRITPDS option is used, will contain condensed information from all of the above seven condensed files depending on which options are specified during the WRITPDS run.

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Overview of All Reports including Tracing & Analysis

The COBOL reports that are made available through this section are listed below:

1. CALL Analysis Report B-46
2. CALL Hierarchy Report B-47
3. COPY Analysis Report B-48
4. System Data Name Cross-Reference B-50
5. System Cross-Reference for Figurative Constants B-52
6. Table of Contents for Layouts B-53
7. Layout Report B-54
8. System Cross-Reference for Literals B-56
9. System Paragraph Cross-Reference B-57
10. 01 Record Report B-58
11. System Cross-Reference for Special Registers B-61
12. System Record Analysis Report B-62
13. Tracing Literal Paths Reports B-64
14. Verb Analysis Report B-67
15. **Tracing & Analysis** Report B-68

The PARM options that are required to run these reports are listed under the heading, "**PARM OPTIONS**". For most reports, the PARM options require just one option per report (e.g. use option **CALL** for the CALL Analysis Report, **COPY** for COPY Analysis Report, **DATA** for System Data Name Cross-Reference). The following options are applicable to all reports:

C68	LNCNT=	RESOLVE=	VR3
EIB	QUOTE	SORTREG=	VS2
ERRORS	READPDS	STOP	WRITPDS

The Layout Report is affected by many options and optional control statements.

The System Record Analysis Report requires the use of control statements. Also, the RA1, RAA, RAB, RAD, RAS and RAT options are applicable to the System Record Analysis Report.

The System Data Name Cross-Reference and the System Paragraph Cross-Reference have the UNREF option available for including or omitting unreferenced names. The Data Name Cross-Reference report may be limited to control statement use by using the DAS parm option.

The CALL Hierarchy Report allows control statements for Adding and Deleting CALLs.

The Direct Literal Tracing Report requires control statements for specifying data names used for tracing the possible values of literals and the paths used to get a literal to a particular field.

The Verb Analysis Report allows the use of control statements to limit VERBs selected.

The Tracing & Analysis Report (**TRACE Option**) is available for finding data fields by their name (or by a very powerful selection capability), then bringing in all REDEFINES, GROUP fields, and overlapping fields for the name selected, doing Tracing through infinite levels to find all related fields and finally showing all Procedure Division references for all names selected or brought in. Two separate types of control statements are available for SELECTing and BYPASSing.

CALL ANALYSIS PROGRAM-ID / CALL-NAME SEQUENCE 01/01/2001 PAGE 1

PROGRAM-ID	PARAGRAPH-NAME	SEQ-#	CALL / ENTRY STATEMENT		PARAMETERS
PAYMONTH	A070-COMPUTE-DEDUCTIONS	0169	CALL 'PAYDEDUC'	USING	PN-RECORD PN-WEEKLY-DEDUCTION-1 PN-WEEKLY-DEDUCTION-2
		0126	PROCEDURE DIVISION ENTRY (PAYMONTH)		
PAYROLL	A010-VERIFY-EMPLOYEE-NUMBER	0146	CALL 'EMPVERFY'	USING	WS-SYSTEM-DATE PT-EMPLOYEE-NBR WS-VERIFY-CODE
	B010-COMPUTE-FEDERAL-TAX	0026	CALL 'FEDTAX'	USING	WS-SYSTEM-DATE PN-RECORD
	A070-COMPUTE-DEDUCTIONS	0184	CALL 'PAYDEDUC'	USING	PN-RECORD PN-WEEKLY-DEDUCTION-1 PN-WEEKLY-DEDUCTION-2
		0124	PROCEDURE DIVISION ENTRY (PAYROLL)		

A **B** **C** **D** **E**

CALL Analysis Report - Program-Id / CALL-Name Sequence

CALL ANALYSIS CALL-NAME / PROGRAM-ID SEQUENCES 01/01/2001 PAGE 1

PROGRAM-ID	PARAGRAPH-NAME	SEQ-#	CALL / ENTRY STATEMENT		PARAMETERS
PAYROLL	A010-VERIFY-EMPLOYEE-NUMBER	0146	CALL 'EMPVERFY'	USING	WS-SYSTEM-DATE PT-EMPLOYEE-NBR WS-VERIFY-CODE
PAYROLL	B010-COMPUTE-FEDERAL-TAX	0226	CALL 'FEDTAX'	USING	WS-SYSTEM-DATE PN-RECORD
PAYMONTH	A070-COMPUTE-DEDUCTIONS	0169	CALL 'PAYDEDUC'	USING	PN-RECORD PN-WEEKLY-DEDUCTION-1 PN-WEEKLY-DEDUCTION-2
PAYROLL	A070-COMPUTE-DEDUCTIONS	0184	CALL 'PAYDEDUC'	USING	PN-RECORD PN-WEEKLY-DEDUCTION-1 PN-WEEKLY-DEDUCTION-2
PAYMONTH		0126	PROCEDURE DIVISION ENTRY (PAYMONTH)		
PAYROLL		0124	PROCEDURE DIVISION ENTRY (PAYROLL)		

A **B** **C** **D** **E**

CALL Analysis Report - CALL-Name / Program-Id Sequence
Exhibit 5 – (Both Sequences)

A - COBOL Program-Id
B - Paragraph name where the CALL or ENTRY resides
C - Sequence number of the CALL, ENTRY or Procedure Division statement
D - CALL or ENTRY statement
E - Parameters used

```
01/01/2001              CALL HIERARCHY REPORT                PAGE      1

COUNT          HIERARCHY OF CALLS

                DCDMAIN
                + DCDCOBOL
                + +    DCD12CMP
                + +    DCD14IND
      12        + +    ST
                + DCDCOPY
                + +    DCDMCOPY
                + + +      READCOPY
                + + +      READREPL
                + + + +          READCOPY
                + +    DCDMREPL
      12        + +    ST
                + DCDHSKPG
                + +    BANNER
                + +    DCD07PRM
      19        + + +      ER
                + +    DCD08OPT
                + +    DCDTR
      24        + + +      ER
                + +    ER
                + +    GETNM
                + +    PW
       7        + + +      ER
                + DCDPRHP1
                + DCDPXREF
                + +    DCDDDCCR
                + +    DCDOTHER
                + +    DCDPDCCR
                + +    DCDSETRF
      18        + +    ST
                + DCDSCAN1
                + +    DCDCICS
                + +    SCANTOK
       6        + + +      PASSTOK
                + + + +          LASTIME
     125        + + + +          NEXTTOK

      A              B              C
```

Exhibit 6
CALL Hierarchy Report

A - Count of times program is called from above program (Blank for 1 time)
B - Plus (+) closest to program-id is followed uphill to find calling module
C - COBOL Program-id

COPY ANALYSIS MEMBER SEQUENCE 01/01/2001 PAGE 1

MEMBER	PROGRAM	SEQ-#	LEVEL	IDENTIFIER	SECTION
BANKCOPY	DCDLOGIC	0061	01	BC-BANNER-FIELDS	WORKING-STORAGE SECTION
CORRECT	DCDLOGIC	0110	01	COB-REC	WORKING-STORAGE SECTION
CPYREC	DCDLOGIC	0079	01	COB-REC	WORKING-STORAGE SECTION
H02IF	DCDLOGIC	0134		030-COPY-HERE	PROCEDURE DIVISION
INFOTYP7	DCDLOGIC	0012	FD	FILE-1	FILE SECTION
TESTCOPY	PAYMONTH	0024	01	TEST-COPY-REC	WORKING-STORAGE SECTION
	PAYMONTH	0036	01	TEST-COPY-REC-2	WORKING-STORAGE SECTION
TOGO2	DCDLOGIC	0008		SOURCE-COMPUTER	ENVIRONMENT DIVISION

A B C D E F

Exhibit 7

COPY Analysis Report - Member Sequence

A - COPY member name
B - COBOL Program-id
C - Sequence number where the COPY is used in the program
D - Level number associated with the COPY (if applicable)
E - DATA name associated with the COPY (if applicable)
F - DIVISION or SECTION where the COPY member resides

COPY ANALYSIS PROGRAM SEQUENCE 01/01/2001 PAGE 1

PROGRAM	MEMBER	SEQ-#	LEVEL	IDENTIFIER	SECTION
DCDLOGIC	BANKCOPY	0061	01	BC-BANNER-FIELDS	WORKING-STORAGE SECTION
	COBREC1	0110	01	COB1-REC	WORKING-STORAGE SECTION
	CPYREC	0079	01	COB-REC	WORKING-STORAGE SECTION
	H021F	0134		030-COPY-HERE	PROCEDURE DIVISION
	INFOTYP7	0012	FD	FILE-1	FILE SECTION
	TOGO2	0008		SOURCE-COMPUTER	ENVIRONMENT DIVISION
PAYMONTH	TESTCOPY	0024	01	TEST-COPY-REC	WORKING-STORAGE SECTION
	TESTCOPY	0036	01	TEST-COPY-REC-2	WORKING-STORAGE SECTION

A B C D E F

Exhibit 8

COPY Analysis Report - Program Sequence

A - COBOL
B - COPY member name
C - Sequence number where the COPY is used in the program
D - Level number associated with the COPY when applicable
E - Data name associated with the COPY when applicable
F - Division or section where the COPY member resides

SYSTEM DATA-NAME CROSS REFERENCE

PROGRAM SECTION SEQ-# LV DATA-NAME NARRATIVE 01/01/2001 PAGE 05

(CONTINUED) WS-ALL DEDUCTIONS
PN-WEEKLY-FED-TAX @97 (189), PN-WEEKLY-FICA @89 (189),
PN-WEEKLY-STATE-TAX @89 (189)
COMPUTE PN-WEEKLY-PAY-AMOUNT @102 = # (203)
IF # > PN-WEEKLY-GROSS @96 (195,199)
SUBTRACT PN-WEEKLY-DEDUCTION-1 @100 FROM # (200),
PN-WEEKLY-DEDUCTION-2 @101 FROM # (196)

PAYROLL WORKING-STORAGE 0118 88 WS-EMPLOYEE-NBR-INVALID VALUE (MULTIPLE VALUES)
IF # (150)

PAYROLL WORKING-STORAGE 0116 88 WS-EMPLOYEE-NBR-VALID VALUE (MULTIPLE VALUES)

PAYMONTH WORKING-STORAGE 0116 88 WS-END-OF-FILE VALUE 'Y'
PERFORM-UNTIL # (138)

PAYROLL WORKING-STORAGE 0114 88 WS-END-OF-FILE VALUE 'Y'
PERFORM-UNTIL # (137)

PAYMONTH WORKING-STORAGE 0115 05 WS-END-OF-FILE-SW PIC X VALUE SPACE
MOVE 'Y' TO # (135,202)

PAYROLL WORKING-STORAGE 0113 05 WS-END-OF-FILE-SW PIC X VALUE SPACE
MOVE 'Y' TO # (134,220)

PAYMONTH WORKING-STORAGE 0110 05 WS-FICA-AMOUNT PIC S9(4) COMP-3 VALUE +0
COMPUTE # = .0715 (173), 3131.70 (179),
PN-WEEKLY-GROSS @89 (173),
WS-FICA-YTD-TOTAL @109 (179)
COMPUTE WS-FICA-YTD-TOTAL @111 = # (160)
MOVE # TO PN-WEEKLY-FICA @89 (160)

PAYROLL WORKING-STORAGE 0108 05 WS-FICA-AMOUNT PIC S9(4) COMP-3 VALUE +0
COMPUTE # = .0715 (173), 3131.70 (179),
PN-WEEKLY-GROSS @96 (173),
WS-FICA-YTD-TOTAL @109 (179)
COMPUTE WS-FICA-YTD-TOTAL @109 = # (175)
MOVE # TO PN-WEEKLY-FICA @89 (181)
MOVE ZEROS TO # (171)

PAYROLL WORKING-STORAGE 0109 05 WS-FICA-YTD-TOTAL PIC S9(4) COMP-3 VALUE +0
COMPUTE # = PN-YTD-FICA @82 (175),
WS-FICA-AMOUNT @108 (175)
COMPUTE WS-FICA-AMOUNT @108 = # (179)
IF # > 3131.70 (178)

PAYMONTH WORKING-STORAGE 0110 05 WS-FICA-AMOUNT PIC S9(4) COMP-3 VALUE +0
COMPUTE # = .0715 (158), 3131.70 (164),
PN-WEEKLY-GROSS @89 (158),
WS-FICA-YTD-TOTAL @111 (164)
COMPUTE WS-FICA-YTD-TOTAL @111 = # (160)
MOVE # TO PN-WEEKLY--FICA @101 (166)
MOVE ZEROS TO # (156)

PAYMONTH WORKING-STORAGE 0111 05 WS-FICA-YTD-TOTAL PIC S9(4) COMP-3 VALUE +0
COMPUTE # = PN-YTD-FICA @84 (160),
WS-FICA-AMOUNT @110 (160)
COMPUTE WS-FICA-AMOUNT @110 = # (164)
IF # > 3131.70 (163)

A B C D E F G H I

Exhibit 9

System Data Name Cross Reference

A - COBOL program-id
B - Section
C - Sequence number of the data name
D - Level number of the data name
E - Data name
F - All related Procedure Division narrative
G - PICTURE clause
H - USAGE clause
I - VALUE clause

01/01/2001 11:30 SYSTEM CROSS REFERENCE FOR FIGURATIVE CONSTANTS PAGE 01

FIGURATIVE CONSTANTS	PROGRAM	REFERENCES				
SPACE (S)	PAYMONTH	115				
	PAYROLL	113				
ZERO (S)	PAYMONTH	117	123	156	182	186
	PAYROLL	115	121	130	171	197

A **B** **C**

Exhibit 10
System Cross Reference for Figurative Constants

A - Figurative constant
B - COBOL program-id
C - Sequence numbers where the figurative constant is used

```
TABLE OF CONTENTS FOR LAYOUT REPORT        PAGE    1
01/01/2001

PAYMONTH     FILE        PAYROLL-TIME-FILE.....6
PAYROLL      FILE        PAYROLL-TIME-FILE.....1
PAYMONTH     FILE        PAYROLL-UPDATED-FILE..8
PAYROLL      FILE        PAYROLL-UPDATED-FILE..3
PAYMONTH     FILE        PN-RECORD.....8
PAYROLL      FILE        PN-RECORD.....3
PAYMONTH     FILE        PT-RECORD.....6
PAYROLL      FILE        PT-RECORD.....1
PAYMONTH     WORK-ST     WS-AMOUNTS....10
PAYROLL      WORK-ST     WS-AMOUNTS.... 5
```

A **B** **C** **D**

Exhibit 11

Table of Contents for Layouts

A - COBOL program-id
B - Section where record name is located
C - Record name
D - Page number where record layout starts

FILE SECTION LAYOUT REPORT PAGE 1

FD (FILE NAME) PAYROLL-UPDATED-FILE

LABEL RECORDS ARE STANDARD
RECORD CONTAINS 170 CHARACTERS
BLOCK CONTAINS 0 RECORDS

DATA RECORD IS PN-RECORD

	LEVEL	DATA NAME	LENGTH	TYPE	FROM	TO	
72	01	PN-RECORD	170	GROUP	1	170	CALL 'PAYDEDUC' USING # (169) MOVE PT-RECORD @28 TO # (148) WRITE # (197)
73	05	PN-EMPLOYEE-NBR	5	N	1	5	
74	05	PN-EMPLOYEE-LAST-NAME	20	X	6	25	
75	05	PN-EMPLOYEE-FIRST-NAME	15	X	26	40	
76	05	PN-ENDING-DATE	6	GROUP	41	46	
77	05	PN-ENDING-YEAR	2	N	41	42	
78	05	PN-ENDING-MONTH	2	N	43	44	
79	05	PN-ENDING-DAY	2	N	45	46	
80	05	PN-CUMULATIVE-YTD-AMOUNTS	44	GROUP	47	90	
81	10	PN-YTD-GROSS PIC S9(6)V99	8	SNE	47	54	ADD PN-WEEKLY-GROSS @98 TO # (192)
82	10	PN-YTD-FED-TAX PIC S9(6)V99	8	SNE	55	62	
83	10	PN-YTD-STATE-TAX PIC S9(6)V99	8	SNE	63	70	
84	10	PN-YTD-FICA PIC S9(4)V99	6	SNE	71	76	ADD PN-WEEKLY-FICA @101 TO # (193) COMPUTE WS-FICA-YTD-TOTAL @111 = # (160) IF # > 4380.00 (155)
85	10	PN-YTD-DEDUCTION-1 PIC S9(5)V99	7	SNE	77	83	ADD PN-WEEKLY-DEDUCTION-1 @102 TO # (194)
86	10	PN-YTD-DEDUCTION-2 PIC S9(5)V99	7	SNE	84	90	
87	10	PN-CURRENT-EMPL-DATA	31	GROUP	91	121	

PAYMONTH 01/01/2001

A B C D E F G H

Exhibit 12
Layout Report

A - Sequence number of the data name
B - Level number of the data name
C - Data name
D - Length in bytes of this field for computational or packed comp-3 fields, two lengths will be shown in this field. The first one will be in parentheses, and represents what is coded in the PICTURE clause.
E - TYPE code indicating how the field is used **(see chart below)**
F - From position of this field
G - To position of this field
H - Corresponding COBOL narrative (requires use of LNR option to produce this narrative)

Layout **TYPE** Chart

TYPE	Meaning
C	COMP or COMPUTATIONAL
C1	COMP-1
C2	COMP-2
C3	COMP-3
C4	COMP-4
N	NUMERIC (DISPLAY USAGE)
NE	NUMERIC EDITED
PR	USAGE IS POINTER
UI	USAGE IS INDEX
X	ALPHANUMERIC or ALPHABETIC
GROUP	GROUP FIELD

Note: The first seven fields (through NE above) will have an S preceding them if the PICTURE clause is signed.

01/01/2001 11:30 SYSTEM CROSS REFERENCE FOR LITERALS PAGE 01

LITERALS	PROGRAM	REFERENCES				
+0	PAYMONTH	110	111	112		
	PAYROLL	108	109	110		
'Y'	PAYMONTH	047	091	116	135	202
	PAYROLL	047	089	114	134	220
.O715	PAYMONTH	158				
	PAYROLL	173				
00	PAYMONTH	118				
	PAYROLL	116				
04	PAYMONTH	120				
	PAYROLL	118				
2.75	PAYROLL	201				
3131.70	PAYMONTH	163	164			
	PAYROLL	178	179			
43800.00	PAYMONTH	155				
	PAYROLL	170				

A **B** **C**

Exhibit 13

System Cross Reference for Literals

A - Literal
B - COBOL program-id
C - Sequence numbers where literal is used

SYSTEM PARAGRAPH CROSS REFERENCE 01/01/2001 PAGE 01

PROGRAM	SEQ-#	PARAGRAPH	SECTION	SEQ-#	TYPE TRANSFER	PARAGRAPH OF TRANSFER
PAYMONTH	145	A-PROCESS-PAYROLL-RECORDS	S E C T I O N	137	PERFORM	040-PROCESS-ALL-RECORDS
PAYROLL	144	A-PROCESS-PAYROLL-RECORDS	S E C T I O N	136	PERFORM	040-PROCESS-ALL-RECORDS
				138	PERFORM	040-PROCESS-ALL-RECORDS
PAYROLL	168	A060-COMPUTE-FICA	A-PROCESS-PAYROLL-RECORDS	164	GO TO	A050-COMPUTE-STATE-TAX
PAYROLL	217	A800-READ-NEXT-RECORD	A-PROCESS-PAYROLL-RECORDS	151	GO TO	A010-VERIFY-EMPLOYEE-NBR
PAYROLL	224	B-COMPUTE-FEDERAL-TAX	SECTION	159	PERFORM	A040-COMPUTE-FEDERAL-TAX
PAYROLL	231	C-COMPUTE-STATE-TAX00	SECTION	166	PERFORM	A050-COMPUTE-STATE-TAX
A	**B**	**C**	**D**	**E**	**F**	**G**

Exhibit 14

System Paragraph Cross Reference

A - COBOL program-id
B - Sequence number of the paragraph
C - Paragraph or section name
D - Section name that paragraph name belongs to
E - Sequence number of COBOL verb referencing this paragraph or section
F - COBOL verb referencing this paragraph or section
G - Paragraph name that contains the COBOL verb

01 RECORD REPORT LENGTH SEQUENCE 01/01/2001 PAGE 1

LENGTH	PROGRAM	SEQ-#	SECTION	RECORD-NAME
170	PAYMONTH	00028	FILE	PT-RECORD
170	PAYMONTH	00072	FILE	PN-RECORD
170	PAYROLL	00028	FILE	PT-RECORD
170	PAYROLL	00070	FILE	PN-RECORD
09	PAYMONTH	00109	WORKING-STORAGE	WS-AMOUNTS
09	PAYROLL	00107	WORKING-STORAGE	WS-AMOUNTS
06	PAYMONTH	00123	WORKING-STORAGE	WS-SYSTEM-DATE
06	PAYROLL	00121	WORKING-STORAGE	WS-SYSTEM-DATE
03	PAYMONTH	00114	WORKING-STORAGE	WS-SWITCHES
03	PAYROLL	00112	WORKING-STORAGE	WS-SWITCHES

A B C D E

Exhibit 15

01 Record Report - Length Sequence

A - Length in bytes of the 01 record
B - COBOL program-id for this record
C - Sequence number where the record resides
D - Data Division section that contains the record
E - 01 record name

01 RECORD REPORT ENTRY SEQUENCE 01/01/2001 PAGE 1

PROGRAM	SEQ-#	SECTION	RECORD-NAME	LENGTH
PAYMONTH	0028	FILE	PT-RECORD	170
PAYMONTH	00072	FILE	PN-RECORD	170
PAYMONTH	00109	WORKING-STORAGE	WS-AMOUNTS	09
PAYMONTH	00114	WORKING-STORAGE	WS-SWITCHES	03
PAYMONTH	00123	WORKING-STORAGE	WS-SYSTEM-DATE	06
PAYROLL	00028	FILE	PT-RECORD	170
PAYROLL	00070	FILE	PN-RECORD	170
PAYROLL	00107	WORKING-STORAGE	WS-AMOUNTS	09
PAYROLL	00112	WORKING-STORAGE	WS-SWITCHES	03
PAYROLL	00121	WORKING-STORAGE	WS-SYSTEM-DATE	06

A B C D E

Exhibit 16

01 Record Report - Entry Sequence

A - Length in bytes of the 01 record
B - COBOL program-id for this record
C - Sequence number where the record resides
D - Data Division section that contains the record
E - 01 record name

This page intentionally left blank

01/01/2001 11:30 SYSTEM CROSS REFERENCE FOR THE SPECIAL REGISTERS PAGE 01

SPECIAL REGISTERS	PROGRAM	REFERENCES	
DATE	PAYMONTH	131	
	PAYROLL	129	
RETURN-CODE	PAYROLL	130	
SORT-RETURN	PAYROLL	156	173

A **B** **C**

Exhibit 17

System Cross Reference for Special Registers

A - Special register
B - COBOL program-id
C - Sequence number where special register is used

01/01/2001 11:30 SYSTEM RECORD ANALYSIS - 01 RECORD SUMMARY PAGE 1

FROM-TO	PROGRAM	01 RECORD NAME	SEQ-#	LV	DATA NAME	PICTURE	DIRECT-FLAGS SET / USE / TEST	INDIRECT FLAGS
1-70	PAYMONTH	PN-RECORD	0072	01	PN-RECORD		S U SI	UI TI
	PAYMONTH	PT-RECORD	0028	01	PT-RECORD		U	
	PAYROLL	PN-RECORD	0070	01	PN-RECORD		S U SI	UI TI
A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**

Exhibit 18

System Record Analysis Report - 01 Record Summary

A - Beginning and ending record positions for the data name(s) listed
B - COBOL program-id where record resides
C - 01 record name
D - Sequence number where the field resides
E - Level of the data name
F - Data name
G - PICTURE of the data name
H - Direct flags indicating Procedure Division involvement with this field
I - Indirect flags indicating Procedure Division involvement with other fields that are a part of this field

Explanation of **S** (Set), **U** (Used) and **T** (Tested) flags:

S - Data was moved out of this field or the field was in some way modified
U - Data was moved out of this field or the field was used in some way to modify another field
T - The field was tested or compared to another field

01/01/2001 11:30 SYSTEM RECORD ANALYSIS - DATA NAME SUMMARY PAGE 3

FROM-TO	PROGRAM	01 RECORD NAME	SEQ-#	LV	DATA NAME	PICTURE	DIRECT FLAGS SET/USE/TEST	INDIRECT FLAGS	
84-90	PAYMONTH	PN-RECORD	0086	10	PN-YTD-DEDUCTION-2	PIC S9(5) V99		SI UI	
	PAYMONTH	PT-RECORD	0042	10	PT-YTD-DEDUCTION-2	PIC S9(5) V99	S	SI UI	
	PAYROLL	PN-RECORD	0084	10	PN-YTD-DEDUCTION-2	PIC S9(5) V99		SI UI	
91-121	PAYMONTH	PN-RECORD	0087	05	PN-CURRENT-EMPL-DATA			SI UI	
	PAYMONTH	PT-RECORD	0043	05	PT-CURRENT-EMPL-DATA			UI	
	PAYROLL	PN-RECORD	0085	05	PN-CURRENT-EMPL-DATA			SI UI	TI
91-96	PAYMONTH	PN-RECORD	0088	10	PN-CURRENT-HOUR-RATE	PIC S9(4) V99	S	SI UI	
	PAYMONTH	PT-RECORD	0044	10	PT-CURRENT-HOUR-RATE	PIC S9(4) V99		UI	
	PAYROLL	PN-RECORD	0086	10	PN-CURRENT-HOUR-RATE	PIC S9(4) V99	S	SI UI	
97-106	PAYMONTH	PN-RECORD	0089	10	PN-EMP-TAX-CODES	PIC X (10)		SI UI	
	PAYMONTH	PT-RECORD	0045	10	PT-EMP-TAX-CODES	PIC X (10)		UI	
	PAYROLL	PN-RECORD	0087	10	PN-EMP-TAX-CODES	PIC X (10)		SI UI	
107-107	PAYMONTH	PN-RECORD	0090	10	PN-NO-STATE-TAX-FLAG	PIC X		SI UI	
	PAYMONTH	PT-RECORD	0046	10	PT-NO-STATE-TAX-FLAG	PIC X		UI	
	PAYROLL	PN-RECORD	0088	10	PN-NO-STATE-TAX-FLAG	PIC X	T	SI UI	
108-109	PAYMONTH	PN-RECORD	0092	10	PN-CURR-DEDUCTION-CODE1	PIC 99		SI UI	
	PAYMONTH	PT-RECORD	0048	10	PT-CURR-DEDUCTION-CODE1	PIC 99		UI	
	PAYROLL	PN-RECORD	0090	10	PN-CURR-DEDUCTION-CODE1	PIC 99		SI UI	
110-114	PAYMONTH	PN-RECORD	0093	10	PN-CURR-DEDUCTION-AMT1	PIC S9(3)V99		SI UI	
	PAYMONTH	PT-RECORD	0049	10	PT-CURR-DEDUCTION-AMT1	PIC S9(3)V99		UI	
	PAYROLL	PN-RECORD	0091	10	PN-CURR-DEDUCTION-AMT1	PIC S9(3)V99		SI UI	
115-116	PAYMONTH	PN-RECORD	0094	10	PN-CURR-DEDUCTION-CODE2	PIC 99		SI UI	
	PAYMONTH	PT-RECORD	0050	10	PT-CURR-DEDUCTION-CODE2	PIC 99		UI	
	PAYROLL	PN-RECORD	0092	10	PN-CURR-DEDUCTION-CODE2	PIC 99		SI UI	
117-121	PAYMONTH	PN-RECORD	0095	10	PN-CURR-DEDUCTION-AMT2	PIC S9(3)V99		SI UI	
	PAYMONTH	PT-RECORD	0051	10	PT-CURR-DEDUCTION-AMT2	PIC S9(3)V99		UI	
	PAYROLL	PN-RECORD	0093	10	PN-CURR-DEDUCTION-AMT2	PIC S9(3)V99		SI UI	
122-125	PAYMONTH	PN-RECORD	0096	05	PN-WEEKLY-HOURS	PIC S9(3)V99	S	SI UI	
	PAYMONTH	PT-RECORD	0052	05	PT-WEEKLY-HOURS	PIC S9(3)V99		UI	
	PAYROLL	PN-RECORD	0094	05	PN-WEEKLY-HOURS	PIC S9(3)V99	S	SI UI	
126-165	PAYMONTH	PN-RECORD	0097	05	PN-COMPUTED-HOURS			SI UI	TI
	PAYMONTH	PT-RECORD	0053	05	PT-COMPUTED-HOURS			UI	
	PAYROLL	PN-RECORD	0095	05	PN-COMPUTED-HOURS			SI UI	TI
126-131	PAYMONTH	PN-RECORD	0098	10	PN-WEEKLY-GROSS	PIC S9(4)V99	S U T	SI UI	
	PAYMONTH	PT-RECORD	0054	10	PT-WEEKLY-GROSS	PIC S9(4)V99		UI	
	PAYROLL	PN-RECORD	0096	10	PN-WEEKLY-GROSS	PIC S9(4)V99	S U T	SI UI	
132-137	PAYMONTH	PN-RECORD	0099	10	PN-WEEKLY-FED-TAX	PIC S9(4)V99	S	SI UI	
	PAYMONTH	PT-RECORD	0055	10	PT-WEEKLY-FED-TAX	PIC S9(4)V99		UI	
	PAYROLL	PN-RECORD	0097	10	PN-WEEKLY-FED-TAX	PIC S9(4)V99	S U	SI UI	

A B C D E F G H I

Exhibit 19
System Record Analysis Report - Data Name Summary

01/01/2001 POSSIBLE LITERALS FOR EACH FIELD TRACED PAGE 1

SEQ-#	FIELD BEING TRACED	LITERAL
816	HIST-2ND-ACCOUNT	VALUE UNKNOWN
		'A142165513'
		'BB----1235'
		'CUST-E3E'
		'HIST-LD-2G'
		'TKY'
		'TY1236RTY6'
		ALL '4'
		CURRENT-DATE
		SPACES
		ZEROS

A **B** **C**

Exhibit 20

Possible Literals for Each Field Report

A - Sequence Number for the field being traced
B - Field Name
C - Possible Ending Literals available for this field

01/01/2001 POSSIBLE LITERALS SHOWING OWNER FIELDS PAGE 2

TRACED FIELD & RELATED FIELDS		LITERAL	HOW FORMED	HOW FORMED FLAGS	
816	HIST-2ND-ACCOUNT				
A	**B**				
1134	C3-IDENT-ACCT	VALUE UNKNOWN	UNKNOWN VALUE		UNK
	C3-IDENT-ACCT	ALL '4'	MOVE LITERAL	ML	
1116	C3-SUB-ID-1A	VALUE UNKNOWN	UNKNOWN VALUE		UNK
	C3-SUB-ID-1A	SPACES	MOVE FIG CONST		
	C3-SUB-ID-1A	ZEROS	MOVE FIG CONST		
411	CUST-IDNT-ALPHA-1	'A142165513'	INITIAL VALUE	INI	
512	CUST-MAIN-ACCOUNT-3RD-ID	'CUST-E3E'	INITIAL VALUE	INI	
	CUST-MAIN-ACCOUNT-3RD-ID	SPACES	MOVE FIG CONST		
431	CUST-STORAGE-IDENT	'BB----1235'	INITIAL VALUE	INI	
816	HIST-2ND-ACCOUNT	'HIST-LD-2G'	INITIAL VALUE	INI	
1125	S2-CUST-ACCOUNT-TA	'TY1236RTY6'	INITIAL VALUE	INI	
	S2-CUST-ACCOUNT-TA	'TKY'	MOVE LITERAL	ML	
	S2-CUST-ACCOUNT-TA	CURRENT-DATE	MOVE SPEC REG		

C **D** **E** **F** **G**

Exhibit 21

Possible Literals Showing Owner Fields Report

- **A** - Traced Field COBOL Sequence Number
- **B** - Traced Field
- **C** - Related Field COBOL Sequence Number
- **D** - Related Field
- **E** - Possible Literal tied to Related Field
- **F** - How the Literal might be Formed
- **G** - FLAGs for easy reference

01/01/2001 POSSIBLE LITERALS WITH POSSIBLE PATHS PAGE 3

LITERAL	HOW FORMED	SEQ-#	FIELD-NAMES BY TRACING LEVELS
'HIST-LD-2G'	INITIAL VALUE	816	HIST-2ND-ACCOUNT
'CUST-E3E'	INITIAL VALUE	512	- CUST-MAIN-ACCOUNT-3RD-ID
VALUE UNKNOWN	UNKNOWN VALUE	1116	- C3-SUB-ID-1A
'A142165513'	INITIAL VALUE	411	- CUST-IDNT-ALPHA-1
SPACES	MOVE FIG CONST	512	- CUST-MAIN-ACCOUNT-3RD-ID
'BB----1235'	INITIAL VALUE	431	- CUST-STORAGE-IDENT
VALUE UNKNOWN	UNKNOWN VALUE	1134	- C3-IDENT-ACCT
VALUE UNKNOWN	UNKNOWN VALUE	1116	- C3-SUB-ID-1A
SPACES	MOVE FIG CONST	1116	- C3-SUB-ID-1A
ZEROS	MOVE FIG CONST	1116	- C3-SUB-ID-1A
'A142165513'	INITIAL VALUE	411	- CUST-IDNT-ALPHA-1
'TK1236RTY6'	INITIAL VALUE	1125	- S2-CUST-ACCOUNT-TA
VALUE UNKNOWN	UNKNOWN VALUE	1134	- C3-IDENT-ACCT
ALL '4'	MOVE LITERAL	1134	- C3-IDENT-ACCT
VALUE UNKNOWN	UNKNOWN VALUE	1116	- C3-SUB-ID-1A
SPACES	MOVE FIG CONST	1116	- C3-SUB-ID-1A
ZEROS	MOVE FIG CONST	1116	- C3-SUB-ID-1A
'TY1236RTY6'	INITIAL VALUE	1125	- S2-CUST-ACCOUNT-TA
'TKY'	MOVE LITERAL	1125	- S2-CUST-ACCOUNT-TA
CURRENT-DATE	MOVE SPEC REG	1125	- S2-CUST-ACCOUNT-TA
ALL '4'	MOVE LITERAL	1134	- C3-IDENT-ACCT
SPACES	MOVE FIG CONST	1116	- C3-SUB-ID-1A
ZEROS	MOVE FIG CONST	1116	- C3-SUB-ID-1A
'TKY'	MOVE LITERAL	1125	- S2-CUST-ACCOUNT-TA
CURRENT-DATE	MOVE SPEC REG	1125	- S2-CUST-ACCOUNT-TA

A **B** **C** **D**

Exhibit 22

Possible Literals with Possible Paths Report

A - Possible Literal
B - How the Literal might be formed
C - Sequence Number of the Related COBOL Field
D - Tracing Path Levels - *(Follow dash up page to next shorter indentation)*

```
VERB ANALYSIS REPORT                                                    01/01/2001          PAGE      1
VERB        PROGRAM    SEQ-#  PARAGRAPH                    SEQ-1  FIELD-1                  SEQ-2  FIELD-2

MOVE        PAYROLL    00201  A080-COMPUTE-WEEKLY-PAY             2.75                     00100  PN-WEEKLY-DEDUCT
MOVE        PAYROLL    00220  A800-READ-NEXT-RECORD               'Y'                      00113  WS-END-OF-FILE-SW
OPEN        PAYMONTH   00128  010-OPEN-FILES               00020  PAYROLL-TIME-FILE
OPEN        PAYMONTH   00128  010-OPEN-FILES               00064  PAYROLL-UPDATED-FILE
OPEN        PAYROLL    00126  010-OPEN-FILES               00020  PAYROLL-TIME-FILE
OPEN        PAYROLL    00126  010-OPEN-FILES               00064  PAYROLL-UPDATED-FILE
PERFORM     PAYMONTH   00137  040-PROCESS-ALL-RECORDS       00145  A-PROCESS-PAYROLL-RECS
  .
    .
SUBTRACT    PAYMONTH   00181  A080-COMPUTE-WEEKLY-PAY       00103  PN-WEEKLY-DEDUCTION-2    00112  WS-ALL-DEDUCTIONS
SUBTRACT    PAYMONTH   00185  A080-COMPUTE-WEEKLY-PAY       00102  PN-WEEKLY-DEDUCTION-1    00112  WS-ALL DEDUCTIONS

A           B          C      D                            E      F                        G      H
```

Exhibit 23

Verb Analysis Report

A - COBOL verb
B - COBOL program-id
C - Sequence number where the verb resides
D - Paragraph name that contains the verb
E - Sequence number in Data Division where first operand resides
F - Data name of first operand
G - Sequence number in Data Division where second operand resides
H - Data name of second operand

```
COUNT   VERB          PERCENT        VERB ANALYSIS REPORT       ( SUMMARY   PAGE )

  15    MOVE           13.8  %
  10    IF              9.2  %
  04    READ            3.7  %
  02    WRITE           1.8  %
  02    ACCEPT          1.8  %
  30    COMPUTE        27.5  %
          .
            .
              .
  04    PERFORM         3.7  %
  02    GO TO           1.8  %

 109    * TOTAL *     100.0  %

 A        B          C
```

Exhibit 24

Verb Analysis Report - Summary Page

A - Count of COBOL verbs
B - COBOL verb
C - Percent of verb usage compared to all verbs within the program(s)

```
01/01/2001 11:30          TRACING & ANALYSIS SELECT STATEMENTS          PAGE    1

# 1      SELECT  IF  NODE-1 = D*T AND NODE-2 = Y*R AND FIELD-SIZE = 1
                                  /                /                /
    * *   End  of  SELECTS * *   /  NO  ERRORS    /                /
                                /                /                /
                              D*T              Y*R               1        resides in pos 2 - 2 ...  is key to
                             Finds            finds            finds      automatic selection of all REDEFINES,
                            DATE             YEAR             PIC X    GROUP, & Overlapping fields after this field
                             /                /                /          /
                            /                /                /          /
Page    1                  /        TRACING & ANALYSIS - FOLLOW A DATA FIELD                  01/01/2001
Program      Seq#  Level  Data-Name       Directly Referenced Narrative /          /          Section   Sel#
                                                                  /          /          /
NR30PGM1     0248   15    CW-DATE-2-YEAR-FORMAT          PIC X          /                    WORK-ST   1
                                                  resides in pos  2 - 2  in record CW-RECORD          \  Points to
        Narrative show all Procedure      If # = SPACES (1128,1278)                                    # 1 SELECT
        Division References in program ------> If # not = 'R' (1310)
                                          Move # to RN-DATES-N2-IN @367 (1287), RN-DATES-N2-P3 @368 (1196,1223)

  overlap    0244   01    CW-RECORD                                                          WORK-ST
                                                uses field pos   1 - 80
                                          If # not = SPACES (792)
                                          Move HIGH-VALUES to # (985,1380), SPACES to # (832,889,901,967,1481,1503)

  overlap    0245   05    CW-MASTER-RECORD-1ST-OCC                                           WORK-ST
                                                uses field pos   1 - 72
                                          If # not = SPACES (1451,1489)

             0249   88    CW-DATE-TYPE-3                  ( 88 LEVEL HAS MULTIPLE VALUES )  WORK-ST
                                          If # (1286,1300,1308)

             0252   88    CW-DATE-TYPE-2                  VALUE 'M'                         WORK-ST
                                          If # (1280,1327)
                                          If not # (1290,1304,1567,1581,1605)

/ redefines  0253   15    CW-DATE-2-YMD-2          PIC X  REDEFINES field at  0248          WORK-ST
|                         If # not = SPACES (1076)
|                         Move >E= to # (1172,1288), 'N' to # (1175,1293), 'U' to # (1177,1298)
|
| overlap    0263   05    CW-MASTER-REC-2                 REDEFINES field at  0244          WORK-ST
|    \                                    uses field pos   1 - 80
|     \--------- identification of an Overlapping field ----------------/
|
\------- identification of a REDEFINES
```

Exhibit 25

Tracing & Analysis Report

Notes:

- **Everything that can happen to CW-DATE-2-YEAR-FORMAT is shown on this page**
- One field CW-DATE-2-YEAR-FORMAT is selected, and ***every other possible field is listed*** that is a ***REDEFINES***, a ***GROUP field*** for this field, or in any way ***Overlaps this field***
- **Narrative** - All Procedure Division References for every field identified is listed underneath each field
- See next page for infinite levels of TRACING

Page 2 **TRACE # 00001** **TRACING & ANALYSIS REPORT** 01/01/2001
Program Seq# Level Data-Name Directly Referenced Narrative Section

Tracing 1st Pass isolated the following affected fields

traced **0353** 01 **RN-RECORD** WORK-ST
used field pos 1-80
Move SPACES to # (1409)
Move # to **MT-FORMAT-RECORD** @471 (1923) **[TRACED to Page 3 below]**

traced 0367 05 RN-DATES-N2-IN PIC X WORK-ST
uses field pos 2 - 2
If # = ZEROS (1623)
Move SPACES to # (1508,1627)
Move **CW-DATE-2-YEAR-FORMAT** to # (1287) **[TRACED from Page 1 on left]**

traced 0367 05 RN-DATES-N2-P3 PIC X WORK-ST
uses field pos 3 - 3
If # = ZEROS (1624)
Move SPACES to # (1629)
Move CW-DATE-2-YEAR-FORMAT to # (1196,1223)

Page 3 **TRACE # 00002** **TRACING & ANALYSIS REPORT** 01/01/2001
Program Seq# Level Data-Name Directly Referenced Narrative Section

Tracing 2nd Pass isolated the following affected fields

traced **0471** 01 **MT-FORMAT-RECORD** WORK-ST
used field pos 1-68
Move SPACES to # (1386)
Move **RN-RECORD @353** to # (1923) **[TRACED from Page 2 above]**

traced 0476 05 MT-DATES-M3-P1 PIC X WORK-ST
uses field pos 2 - 2
If # = ZEROS (1923)

traced 0476 05 MT-DATES-M3-P2 PIC X WORK-ST
uses field pos 3 - 3
If # = ZEROS (1923,2031)
Move SPACES to # (2052)

Tracing 3rd Pass found no additional fields - No additional tracing passes possible

Exhibit 25 (Continued)

Notes:

- All Possible Uses are **traced** infinite levels and shown on this page
- **First tracing pass finds fields RN-DATES-N2-IN & RN-DATES-N2-P3** *(from previous page)*
- **Also picked up in first tracing pass is overlapping field RN-RECORD**
- **Second tracing pass finds field MT-FORMAT-RECORD** *(from this page*)
- **Also found in 2nd pass are overlapping fields MT-DATE-M3-1 & MT-DATE-M3-2**
- **Third tracing pass finds NO MATCHES and tracing is stopped here**

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Data Dictionary Interface File

With the use of either PARM option DICT or SRA, a file is produced which may be used to interface with commercial Data Dictionary systems.

The file produced contains basically the same information, which is printed on the System Record Analysis Report except that it is in a file format rather than a printed report. The record size is 120 characters. The block size must be a multiple of 120. 3120 is recommended. The DDNAME is DCDDICT. The file is opened EXTEND for each program which allows for several programs to be run through during one run. See the PARM OPTIONS (DDF and CDD) for using the OPEN EXTEND across several DCD IV runs.

See the COBOL COPY record SYS1RECD and the associated description of these fields under this heading for a description of the fields within these records. Also, see the System Record Analysis Report under the heading, "Overview of DCD IV Other COBOL Reports".

To create a Data Dictionary Interface File, control statements must be used. These control statements are the same control statements used in producing a System Record Analysis Report. In fact, the System Record Analysis Report will be printed unless the REPORTS DD is dummied out. Even though the control statements require program-id, only one program at a time may be used when creating a Data Dictionary Interface File.

See the next heading, "Control Statements for System Record Analysis", for creating the control statements necessary for creating a Data Dictionary Interface File.

The SYS1RECD COPY record shown here may be used as a guide for creating a COBOL or other program to use this file. This COPY member is provided on the installation tape within the member CASEMBRS.

```
000100**                                COPY      SYS1RECD
000200     01   SRA-SYSTEM-RECORD-ANAL-REC.
000300          05   SRA-SET-NUMBER                  PIC 999.
000400          05   SRA-FROM-TO-LOCATIONS.
000500               10   SRA-FROM-POSITION          PIC 9(6).
000600               10   SRA-TO-POSITION            PIC 9(6).
000700          05   SRA-PROGRAM-ID                  PIC X(8).
000800          05   SRA-RECORD-NAME                 PIC X(30).
000900          05   SRA-DATA-NAME                   PIC X(30).
001000          05   SRA-EXP-CMPLR-NBR               PIC 9(5).
001100          05   SRA-LEVEL-NUMBER                PIC XX.
001200          05   SRA-TYPE-USAGE                  PIC X(2).
001300               88   SRA-TYPE-COMP                          VALUE 'C  '.
001400               88   SRA-TYPE-COMP-1                        VALUE 'C1'.
001500               88   SRA-TYPE-COMP-2                        VALUE 'C2'.
001600               88   SRA-TYPE-COMP-3                        VALUE 'C3'.
001700               88   SRA-TYPE-COMP-4                        VALUE 'C4'.
001800               88   SRA-TYPE-DEFAULT-DISPLAY               VALUE '   '.
001900               88   SRA-TYPE-DISPLAY                       VALUE 'D '.
002000               88   SRA-TYPE-DISPLAY-1                     VALUE 'D1'.
002100               88   SRA-TYPE-INDEX                         VALUE 'IX'.
002200               88   SRA-TYPE-USAGE-IS-INDEX                VALUE 'UI'.
002300               88   SRA-TYPE-POINTER                       VALUE 'PR'.
002400          05   SRA-FLAGS.
002500               10   SRA-SET-FLAG               PIC X.
002600                    88  SRA-DIRECT-SET                     VALUE 'S'.
002700               10   SRA-USED-FLAG              PIC X.
002800                    88  SRA-DIRECT-USED                    VALUE 'U'.
002900               10   SRA-TESTED-FLAG            PIC X.
003000                    88  SRA-DIRECT-TESTED                  VALUE 'T'.
003100               10   SRA-INDIR-SET-FLAG         PIC X.
003200                    88  SRA-INDIRECT-SET                   VALUE 'S'.
003300               10   SRA-INDIR-USED-FLAG        PIC X.
003400                    88  SRA-INDIRECT-USED                  VALUE 'U'.
003500               10   SRA-INDIR-TESTED-FLAG      PIC X.
003600                    88  SRA-INDIRECT-TESTED                VALUE 'T'.
003700          05   SRA-PICTURE-CLAUSE              PIC X(21) .
003800          05   SRA-FILLER                      PIC X.
```

The following is a description of the fields within the SYS1RECD COPY member:

1. SRA-SET-NUMBER — Sequential number starting at 1 showing which set of control cards produced this set of records.
2. SRA-FROM -TO- LOCATIONS — From and to record positions for this data name.
3. SRA-PROGRAM-ID — Taken from the program-id in the Identification Division.
4. SRA-RECORD-NAME — The name of the 01 record which contains this data name.
5. SRA-DATA-NAME — Self-explanatory
6. SRA-EXP-CMPLR-NBR — Compiler number or sequence number in the program of this data name.
7. SRA-LEVEL-NUMBER — 01-49 level number associated with this data name.
8. SRA-TYPE-USAGE — Usage of this data name.
9. **SRA-FLAGS** — Contains flags showing how this data field is used in the program.
    - **Direct flags** indicate this field was involved in the Procedure Division statement which caused this flag.
    - **Indirect flags** indicate this field was not involved in the Procedure Division statement which caused this flag.
    - **SET** indicates that this field is changed.
    - **USED** indicates that this field was used to modify in some way another field.
    - **TESTED** indicates that this field was used in a comparison.
10. SRA-PICTURE-CLAUSE — The first 21 characters of the PICTURE clause associated with this data name.
11. SRA-FILLER — Not used at this time.

WRITPDS and READPDS Options

In DCDIV, a feature is available to allow the storing of work file information for all reports with the exception of the Tracing & Analysis report. The storing of information is done in condensed format as members on partitioned data sets for use at any time for printing reports from. This feature is controlled by two options and requires extra JCL.

To store information using this feature, do the following:

1. Catalog a partitioned data set with the following attributes:

   ```
   RECFM=FB
   LRECL=3120
   BLKSIZE=3120 or a multiple of 3120
   DSORG=PO
   ```

2. Add a DD statement after the EXEC DCDCOBOL PROC as follows:

   ```
   //DCD.DCDPDS   DD   DSN=PDS.WITH.3120.LRECL,DISP=SHR
   ```

3. Run one or several DCD IV runs using one or several programs each time. With each run, do the following:
   a) Add the WRITPDS PARM option to the DCDCOBOL PROC as shown in the example below. Also add parm option BEGIN or CONT. BEGIN is used during the first run to clear everything on the user created PDS. The CONTinue option is used for all subsequent runs and will not clear the user PDS.
   b) Add every one of the report options that will be wanted as stored information on the PDS. It will be impossible to later run a READPDS for a report option not specified on the WRITPDS run. Conversely, it is important not to specify unwanted options as the workspace on the PDS will be wasted with unused information.

An example follows:

```
//STEP1     EXEC   DCDCOBOL,DATA=,LAYOUT=,PARA=,OTHER='WRI,BEGIN'
//DCD.COBOLIN    DD   DSN=USER.COBOL.LIBRARY(PROG1),DISP=SHR
//                DD   DSN=USER.COBOL.LIBRARY(PROG2),DISP=SHR
//DCD.COPYLIB    DD   DSN=USER.COPY.LIB,DISP=SHR
//DCD.DCDPDS     DD   DSN=USER.CREATED.PDS,DISP=SHR
```

The above example will store the information necessary to produce the System Data Name Cross Reference, System Paragraph Cross Reference and Layout Reports for programs PROG1 and PROG2 on the partitioned data set for later printing. The reports will not appear in this run. An exception to this is the report showing the control statements used when using the SRA option for the System Record Analysis Report, which will appear when using the WRITPDS option. It will not appear when using the READPDS option.

To **print** reports using this feature, do the following:

1. Put a step invoking the Member Fetcher PROC ahead of the EXEC DCDCOBOL PROC to bring in the members wanted. Point the user PDS in the Member Fetcher PROC to the same PDS used in the DCDPDS ddname in the DCDCOBOL step with the WRITPDS option. For information on using the PROC MBRFETCH, see the heading "Control Statements for Using the MBRFETCH PROC" in this section.

   The possible combinations of control statements that may be used with the READPDS option are shown here:
   a) INDD=ddname=ALL
   b) INDD=ddname=MEMBER
   c) INDD=ddname=PREFIX=prefix

   Do **NOT** use the COBOL or COBRECS combination here.

2. Add an extra DD with the name of DCDREPDS after the DCDCOBOL PROC as shown in the example that follows:

3. Add the READPDS option by using OTHER=REA on the DCDCOBOL PROC line.

4. Only use PARM options that have also been used consistently in WRITPDS DCD IV runs.

   An example follows:

```
//STEP1   EXEC    MBRFETCH
//MBR.OUTSET    DD   DCB=(LRECL=3120,BLKSIZE=3120)
//MB.CTLCDMBR      DD  *
INDD=USERDD=PREFIX=TRN20
INDD=USERDD=PREFIX=TRN30
//MBR.USERDD DD   DSN=PDS.WITH.3120.LRECL,DISP=SHR
//*
//STEP2   EXEC   DCDCOBOL,DATA=,PARA=,OTHER=REA
//DCD.DCDREPDS  DD   DSN=&&PASSFILE,DISP=(OLD,PASS),
//              DCB=LRECL=3120
```

In the previous example, both the System Data Name Cross Reference and System Paragraph Cross Reference Reports will be produced using the information created during the WRITPDS run.

Do not use the WRITPDS option along with the READPDS option. The information created by using the WRITPDS option will not be available for use by the READPDS option.

DCDFETCH - Newer Software to replace MBRFETCH

This software is newer software with additional features to use in place of our older MBRFETCH software. The JCL is different and with one additional work file. The format of the control statements is almost the same with additional features. Older control statements within MBRFETCH need to have INDD= replaced with PDS= for those statements to work within this new software.

Additional Features within this software include the following:

1) A Member Count is shown for each DDNAME processed
2) Enhanced Error Messages to identify any error in processing control statements or for errors found when handling any of the files including the Partitioned Data Sets pointed to by the PDS=DDNAME= control statements.
3) A MULTIPLE option to allow multiple PREFIXs for three types of control statements; COBOL=, COBRECS=, and PREFIX=. Use of this option can allow one pass for multiple PREFIXs, as opposed to many passes with the older MBRFETCH software.

Important Note: Partitioned Data Sets with this software as with the older MBRFETCH software may NOT be concatenated. In place of concatenation, additional control statements pointing to additional DDNAMES must be used to point to each DDNAME that would otherwise be concatenated.

JCL for the DCDFETCH software

The following JCL is used for running this software.

```
//STEP     EXEC    PGM=DCDFETCH,REGION=1024K
//OUTPUT     DD    DSN=&&PASSFILE,DISP=(,PASS),UNIT=SYSDA,
//           SPACE=(CYL,(5,10))
//PRINT      DD    SYSOUT=*
//SYSOUT     DD    SYSOUT=*
//WORKFIL1   DD    UNIT=SYSDA,SPACE=(TRK,(1,2))
//WORKFIL2   DD    UNIT=SYSDA,SPACE=(CYL,(1,2))
//CTLINFO    DD    *
Control statements inserted here
/*
```

Additional DD statements are required that point to Partitioned Data Sets used to get MEMBERS from. The DDNAMEs for these DDs are inserted into the control statements the user adds. See examples provided over the next several pages.

A PROC for invoking this JCL is shown on the next page.

PROC for the DCDFETCH* software

The following PROC (DCDFETCH) is available on the file DCDIV.CNTL provided by our install files.

```
//DCDFETCH   PROC   PRINT=*,WORK=SYSDA
//PDS          EXEC   PGM=DCDFETCH,REGION=1024K
//OUTPUT     DD    DSN=&&PASSFILE,DISP=(,PASS),UNIT=&WORK,
//           SPACE=(CYL,(5,10)
//PRINT        DD    SYSOUT=&PRINT
//SYSOUT     DD    SYSOUT=&PRINT
//WORKFIL1 DD    UNIT=&WORK,SPACE=(TRK,(1,2))
//WORKFIL2 DD    UNIT=&WORK,SPACE=(CYL,(1,2))
```

The PDS Member Fetcher PROC MBRFETCH is available for pulling one or several members from a partitioned data set (PDS) and creating one sequential data set. This data set may be used as input to the DCDCOBOL PROC. (This PROC is also embedded as one step in the DCDJCL PROC which is covered in the section on JCL PROC Analysis Reports Facility.)

Control Statements for Using the MBRFETCH PROC

The DD name for these control statements is CTLINFO. This is different from the DD name used with the MBRFETCH program.

As with the MBRFETCH program, control statements are used to indicate which members are to be selected. The first these control statements is shown below. The second format, sometimes used for adding a PREFIX or MEMBER name is discussed where appropriate in the next several pages and examples.

Columns	1 through 3	-The constant (PDS)
Column	4	- An equal sign (=)
Columns	5 through *a*	- The name of a made-up DDNAME
Column	*a*+1	- An equal sign (=) with no spaces before or after it.
Columns	*b* through *c*	- One of the following words: 1. ALL 2. COBOL 3. COBRECS 4. MEMBER 5. PREFIX

The remaining two fields <u>are required</u> if PREFIX was used as the last operand and <u>are optional</u> if COBOL or COBRECS was used as the last operand. They are not permitted if either ALL or MEMBER is used as an operand.

Column	*c*+1	-An equal sign (=) with no spaces before or after it.
Columns	*d* through *e*	-A 1 to 7 characters prefix which will be used to limit selection or an eight character word (MULTIPLE) to indicate that multiple PREFIX control statements will follow this control statement.

*DCDFETCH is used in place of prior name PDSFETCH as CA Associates uses the PDSFETCH name.

An illustration of the possible combinations is listed below:

1. PDS=ddname=ALL
2. PDS=ddname=COBOL
3. PDS=ddname=COBRECS
4. PDS=ddname=MEMBER
5. PDS=ddname=PREFIX=prefix
6. PDS=ddname=COBOL=prefix
7. PDS=ddname=COBRECS=prefix
8. PDS=ddname=PREFIX=MULTIPLE
9. PDS=ddname=COBOL=MULTIPLE
10. PDS=ddname=COBRECS=MULTIPLE

An example showing the use of these control statements is listed below:

```
//STEP1      EXEC    DCDFETCH
//PDS.OUTPUT       DD  DCB=(LRECL=80,BLKSIZE=3120)
//PDS.CTLINFO      DD  *
INDD=USERDD=COBOL
//PDS.USERDD       DD  DSN=USER.COBOL.LIBRARY,DISP=SHR
```

The above example will pull off all COBOL programs from the library specified by the DD name USERDD and pass them out to a sequential data set defined by the OUTPUT DD.

If members are wanted from more than one PDS library, then multiple DD names may be used. An example is listed below:

```
//STEP2      EXEC    DCDFETCH
//PDS.OUTPUT       DD  DCB=(LRECL=80,BLKSIZE=3120)
//PDS.CTLINFO      DD  *
INDD=USERDD=COBOL
INDD=OTHERDD=COBOL
//PDS.USERDD       DD  DSN=USER.COBOL.LIBRARY1,DISP=SHR
//PDS.OTHERDD      DD  DSN=USER.COBOL.LIBRARY2,DISP=SHR
```

The use of the following words for selection is described here:

ALL, COBOL, COBRECS, MEMBER, PREFIX=prefix, COBOL=prefix, COBRECS=prefix, PREFIX=MULTIPLE, COBOL=MULTIPLE, and COBRECS=MULTIPLE

ALL ALL indicates that all members will be selected from the partitioned data set. This option should not be used here. Instead, the options COBOL or COBRECS should be used. An exception to this rule occurs when using the READPDS option, in which case, ALL should be used and COBOL and COBRECS may not be used.

COBOL COBOL indicates that all COBOL programs are to be pulled off of the partitioned data set. If non-COBOL programs are found, then they are discarded.

COBRECS COBRECS indicates that all COPY members which are 01 records or record groups beginning with a level number (02-48) are to be pulled off of the PDS. Those members that do not conform to this selection are bypassed for selection. COBRECS may be used when the LOR option is used.

MEMBER MEMBER indicates that the user wants to make further selection with member name control statements. These control statements immediately follow the control statement which contains the word MEMBER and must begin in column 1 and contain a 1-8 character MEMBER NAME. An example is listed below:

```
//STEP3      EXEC    DCDFETCH
//PDS.CTLINFO        DD   *
PDS=USERDD=MEMBER
MEMBER1
MEMBER2
MEMB03
MEMBER04
//PDS.USERDD         DD   DSN=USER.PDS,DISP=SHR
```

PREFIX PREFIX indicates that selection is to be done strictly on the basis of a 1 to 7 character prefix that follows the (=) sign after the word PREFIX, or that selection is done with multiple prefixes if the characters MULTIPLE follow the (=) sign. It is recommended that this option not be used here and that **COBOL=prefix** or **COBRECS=prefix** be used in its place. Prefix is discussed more below and is shown in some of the COBOL= (prefix or MULTIPLE) examples that follow.

Six ways to use selection via a prefix follow:

COBOL=prefix pulls off all COBOL programs from the PDS specified that begins with the same letters that are specified in the prefix. The prefix may not exceed seven characters in length.

COBRECS=prefix pulls off all COPY members that have as their first COBOL record, a level number from (01-49) that have a matching prefix. This is used when using PARM option LOR for LAYOUTS. Again prefix may not exceed seven characters in length.

PREFIX=prefix pulls off all members that have a matching 1-7 character prefix.

COBOL=MULTIPLE requires that one or more control statements follow this control statement and that each control statement begin in column 1 and contain a 1-7 character prefix. Used for pulling off COBOL programs.

COBRECS=MULTIPLE requires that one or more control statements follow this control statement and that each control statement begin in column 1 and contain a 1-7 character prefix. Used for pulling off COBOL records.

PREFIX=MULTIPLE requires that one or more control statements follow this control statement and that each control statement begin in column 1 and contain a 1-7 character prefix.

An example where selection is done with the use of one prefix follows:

```
//STEP4    EXEC     DCDFETCH
//PDS.OUTPUT         DD   DCB=(LRECL=80,BLKSIZE=3120)
//PDS.CTLINFO        DD   *
INDD=USERDD=COBOL=M4
//PDS.USERDD         DD   DSN=USER.COBOL.LIBRARY,DISP=SHR
```

In the above example, all COBOL programs whose member name begins with the prefix M4 will be selected for passing on to the next step.

An example where selection is done for multiple prefixes on one PDS follows:

```
//STEP5    EXEC     DCDFETCH
//PDS.OUTPUT         DD   DCB=(LRECL=80,BLKSIZE=3120)
//PDS.CTLINFO        DD   *
INDD=USERDD=COBOL=MULTIPLE
M4
M5
M6A
M6B
//PDS.USERDD         DD   DSN=USER.COBOL.LIBRARY,DISP=SHR
```

In the above example, all COBOL programs whose member name begins with the prefixes M4, M5, M6A, and M6B will be selected for passing on to the next step.

Further notes on this PDS member fetch software follow:

1. Compressing the PDS if possible before accessing the data set may be helpful.
2. Multiple control statements may be used for any of the above formats.
3. To prevent obtaining duplicate members, do not mix formats in the same run.
4. When using DCDFETCH with the READPDS option, (see the heading ‘WRITPDS and READPDS Options’ in this section), replace LRECL=80 with LRECL=3120 in the //PDS.OUTPUT DD.
5. A listing of Error Message that may be generated from this utility are listed on the next two pages.
6. Look for a return code of Zero if there are no errors. Look for a return code of 0008 if errors are found.

Error Messages that may be generated from DCDFETCH utility.

Message #	Message
040	Expecting extra control statements for previous PDS=
050	No Members were found
A011	Expecting extra control statements for just previous PDS=
A021	Found blank control statement
A022	Looking for PDS= in columns 1-5
A023	Looking for first MEMBER in columns 1-8
C011	DDNAME found has more than 8 CHARS
C012	User DDNAME not found after PDS=
C013	DDNAME has invalid Non-Alphanumeric CHAR
C014	Undefined error in previous entry
C021	Type DDNAME not found after DDNAME=
C022	Type DDNAME has invalid characters
C023	Expecting ALL, COBOL, COBRECS, MEMBER or PREFIX
C041	PREFIX not found after XXXX (where XXXX = (COBOL=), (COBRECS=), or (PREFIX=)
C042	Prefix must be 7 characters or less
C043	Invalid Character found in PREFIX
C050	More than 20 PDS= records
C060	Duplicate DDNAME Invalid - BYPASSING
D011	Unidentified Control Record - BYPASSING
D012	Found more than 100 Member or Prefix records for last PDS=
D013	Invalid Character found in previous entry - Previous Entry ignored
D014	Previous PREFIX over 7 characters in length and ignored
D015	Previous MEMBER over 8 characters in length and ignored
E011	ERROR with DDNAME (DDNAME) Error in finding
E012	ERROR - DDNAME (DDNAME) was not found
E013	ERROR - DDNAME (DDNAME) Error found while validating DDNAME
E031	ERROR with internal work file with DDNAME (WORKFIL1)
E032	ERROR - while reading PDS with DDNAME (DDNAME)

EA31	ERROR - Member (Member-Name) not found on DDNAME (DDNAME) for just previous PDS=
EA32	ERROR while opening file specified in DDNAME (DDNAME)
EA33	ERROR while accessing file specified in DDNAME (DDNAME)
EA34	ERROR - Problem while reading all members from UNCONCATENATED DDNAME (DDNAME)
EB41	ERROR - Member (Member-Name) not found on DDNAME (DDNAME) for just previous PDS=
EB42	ERROR while opening file specified in DDNAME (DDNAME)
EB43	ERROR while accessing file specified by DDNAME (DDNAME)
EB44	ERROR - problem while reading all Members from UNCONCATENATED DDNAME (DDNAME)
G011	ERROR while reading record from DDNAME (DDNAME)
G012	ERROR with LRECL found for PDS for DDNAME (DDNAME) - should be 80 or 3120
G013	ERROR while reading record in DDNAME (DDNAME)
G030	ERROR - Unexpected Record Length of (nnnnn) - Must be 80 or 3120
H011	ERROR while reading from DDNAME (DDNAME)
H012	ERROR with LRECL found for PDS for DDNAME (DDNAME) - Should be 80 or 3120
H013	ERROR while reading record in DDNAME (DDNAME)
H040	ERROR - Unexpected Record Length of (nnnnn) - Must be 80 or 3120
I020	ERROR in logic for M2-NBR-CHARS = ‘NNNN’

Release 4.0

DCD IV

Computer Aided Software Engineering

(CASE) Files

Use for CASE Files

These files were made available with the new DCD IV system for two reasons. The first reason is in response to our existing users of our older DCD III system. The second reason is in response to the general direction that the industry is going with respect to re-engineering of COBOL programs.

These files are for the most part not intended to be an end result of re-engineering. Instead, these files are designed to facilitate the users in getting to the end result chosen for their particular company. The CASE files provide a very complete and accurate set of files. They cross reference both the DATA and the PROCEDURE divisions of one or more COBOL programs.

At **MARBLE Computer Inc.**, the observation obtained from people who use our software is that no two users follow the exact same course in re-engineering. The usage varies greatly; it is dependent upon the needs of each particular company.

DCD IV

Computer Aided Software Engineering (CASE) Files

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Use of This Section

This section is provided to make the user aware of the work files that are available. They may be used for in-house projects which deal in the re-engineering of COBOL software.

Within this section, the information provided in these files is shown in two formats:

1. A listing of a COBOL COPY record which was used internally within DCD IV to create this file.
2. A description of the fields within that record

The COBOL COPY records that were used internally to build these files are made available with this software package. All eleven COPY members are contained within the COPY member CASEMBRS on the second file of the installation tape. See Installation Guide sub-heading, "**DCD IV JCL Procedure Library**".

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Rules and Restrictions When Producing CASE Files

These work files are available by using DCD IV following the instructions given in one of two earlier sections and by following the additional instructions given here. The earlier sections are:

1. Alternate Compile Listing Facility
2. Other COBOL Reports Facility

When creating these files, a DCD IV report or reports must be run from one of the two previously mentioned sections using the instructions given there. Additionally, other instructions and certain restrictions are listed in this section.

If the report generated is not wanted and the file generated is from the Other COBOL Reports Facility Section, then the REPORTS DD may be dummied out. The PRINT DD should never be dummied out as errors that occur during running are listed there.

The following are restrictions that must be followed when creating these records:

1. Only one program at a time may be run when producing the CASE files. (An exception to this is the Data Dictionary Interface File).
2. When accessing a particular file and the instructions indicate that a certain report option needs to be turned on, other report options should not be turned on unless indicated. In most cases, turning on another report option will cause the file wanted by the user to be destroyed before the user can access the file.
3. Do not pre-catalog, change the LRECL or modify the DISP for the work file which contains the information desired. The work files in DCD IV are used multiple times within one DCD IV run with varying record sizes. When the DCD IV step is finished, the user may copy the file to another file using the LRECL and BLKSIZE specified individually for that file within this section.
4. When using the file created, the first record in each file must be bypassed if characters 1 through 6 in that record contain the constant MARBLE. These records are control records which contain date and time information and LRECL of the file.

More specific instructions are given with each available work file.

Note: The Data Dictionary Interface File mentioned in the Table of Contents does not specifically follow rules given here. Instead, it is more fully documented in the Other COBOL Reports Facility Section in this manual.

Sample JCL to Access and Print CASE Files

The following JCL is provided as an example of how to access the CASE files shown in this section.

The sample provided here traps the Data Analysis Information File and prints it out in a following IEBGENER step. To catalog a CASE file or otherwise save the information, provide other JCL in the SYSUT2 DD of the IEBGENER step.

```
//STEP1    EXEC     DCDCOBOL,DATA=
//DCD.DCDWK03  DD    DSN=&&TEMP03,DISP=(,PASS),DCB=(LRECL=0,RECFM=U)
//DCD.COBOLIN  DD    DSN=USER.COBOL.PDS (USERPROG) ,DISP=SHR
//DCD.COPYLIB  DD    DSN=USER.COPY.LIB,DISP=SHR
//*
//STEP2  EXEC       PGM=IEBGENER,REGION=256K
//SYSIN             DD    DUMMY
//SYSPRINT          DD    SYSOUT=*
//SYSUT1            DD    DSN=&&TEMP03,DISP=(OLD,DELETE) ,
//                     DCB=(RECFM=FB,LRECL=130,BLKSIZE=3120)
//SYSUT2            DD    SYSOUT=*, DCB=(RECFM=FB,LRECL=130,BLKSIZE=3120)
```

Note - As of release 3.2, a full DCB is required on both SYSUT1 and SYSUT2 when accessing CASE files AND a DCB as shown above on the //DCD.DCDWKnn file must be present [DCB=(LRECL=0,RECFM=U)].

Data Division Information File

This file contains a description of the Data Division attributes for each field in the Data Division.

To produce the file:

1. Use one of the PROCs in the Other COBOL Reports Facility Section of this manual, (e.g. PROC DCDCOBOL).

2. Use the PROC Symbolic DATA= on the EXEC DCDCOBOL (or other PROC name) line to turn on the DATA PARM option.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK01.

2. The LRECL of the file is 104.

The following pages show the internally used Data Division COPY member that was used to create the file and a description on the related fields within the record.

```
**                                  COPY      INFOTYP1          (IN1)
01  CIE-1-DATA-DIVISION-INFO.
    05  CIE-1-SOURCE-LINE-NUMBER                PIC 9(5) .
    05  CIE-1-EXPANDED-LINE-NUMBER              PIC 9(5) .
    05  CIE-1-TYPE-FLAG                         PIC X.
        88  CIE-1-TYPE-NORMAL                                VALUE SPACE.
        88  CIE-1-TYPE-FILE-NAME                             VALUE 'F' .
        88  CIE-1-TYPE-REC-CONTAINS                          VALUE 'R' .
        88  CIE-1-TYPE-BLK-CONTAINS                          VALUE 'B' .
        88  CIE-1-TYPE-LABEL-RECORDS                         VALUE 'L' .
        88  CIE-1-TYPE-RECORDING-MODE                        VALUE 'M' .
        88  CIE-1-TYPE-VALID                                 VALUES ARE ' '
                                                                     'F'
                                                                     'R'
                                                                     'L'
                                                                     'M'
                                                                     'B'.
        05  CIE-1-LEVEL-NUMBER                  PIC 99.
        05  CIE-1-DATA-NAME                     PIC X(30) .
        05  CIE-1-START-ADDRESS                 PIC 9(9) .
        05  CIE-1-END-ADDRESS                   PIC 9(9) .
        05  CIE-1-OCCURS-FACTOR                 PIC 9(9) .
        05  CIE-1-REDEFINES-SRC-LINE            PIC 9(9).
        05  CIE-1-REDEFINES-EXP-LINE            PIC 9(5) .
        05  CIE-1-ITEM-TYPE                     PIC X.
            88  CIE-1-ITEM-GROUP                             VALUE 'G'.
        05  CIE-1-SECTION-IND                   PIC X.
            88  CIE-1-SECTION-FILE                           VALUE 'F'.
            88  CIE-1-SECTION-WS                             VALUE 'W'.
            88  CIE-1-SECTION-LINKAGE                        VALUE 'L'.
            88  CIE-1-SECTION-REPORT                         VALUE 'R'.
            88  CIE-SECTION-COMM                             VALUE 'C'.
        05  CIE-1-TYPE-USAGE                    PIC XX.
            88  CIE-1-TYPE-COMP                              VALUE 'C '.
            88  CIE-1-TYPE-COMP-1                            VALUE 'C1'.
            88  CIE-1-TYPE-COMP-2                            VALUE 'C2'.
            88  CIE-1-TYPE-COMP-3                            VALUE 'C3'.
            88  CIE-1-TYPE-COMP-4                            VALUE 'C4'.
            88  CIE-1-TYPE-DEFAULT-DISPLAY                   VALUE '  '.
            88  CIE-1-TYPE-DISPLAY                           VALUE 'D '.
            88  CIE-1-TYPE-DISPLAY-1                         VALUE 'D1'.
            88  CIE-1-TYPE-INDEX                             VALUE 'IX'.
            88  CIE-1-TYPE-USAGE-IS-INDEX                    VALUE 'UI'.
            88  CIE-1-TYPE-POINTER                           VALUE 'PR'.
        05  CIE-1-CLASS                         PIC X.
            88  CIE-1-CLASS-ALPHA                            VALUE 'X'.
            88  CIE-1-CLASS-EDITED                           VALUE 'E'.
            88  CIE-1-CLASS-NUMERIC                          VALUE 'N'.
        05  CIE-1-INTEGER-DIGITS                PIC 99.
        05  CIE-1-FRACTION-DIGITS               PIC 99.
        05  CIE-1-ALT-OCCURS-NBR-GROUP-6.
            10  CIE-1-USE-COMP-FIELD-SW         PIC X (01).
                88  CIE-1-USE-COMP-FIELD                     VALUE 'Y'.
            10  CIE-1-OCCURS-NBR-TIMES          PIC 9(05).

    ** NEXT 4 LINES REDEFINE              ********ABOVE     5   BYTES.  *****
            10  CIE-1-OCCURS-NBR-GROUP-5        REDEFINES
                                                CIE-1-OCCURS-NBR-TIMES.
                15  CIE-1-COMP-UNUSED-BYTE                   PIC X(10).
                15  CIE-OCCURS-NBR-TIMES-COMP    COMP        PIC 9(09).
```

Exhibit 1

COPY Member for the Data Division Information File

Description of Individual Fields

1.	CIE-1-SOURCE-LINE-NUMBER	Do not use.
2.	CIE-1-EXPANDED-LINE-NUMBER	The expanded sequence number (after COPY members have been resolved and brought into the program) where this data field is defined in the program.
3.	CIE-1-TYPE-FLAG	An indicator which has a value of SPACE for most records and a non-space value for records containing FD information.
4.	CIE-LEVEL-NUMBER	Level number associated with the data field in this record.
5.	CIE-DATA-NAME	Data name.
6.	CIE-1-START-ADDRESS	Beginning position relative to 1 for this record where this field starts within the 01 record.
7.	CIE-1-END-ADDRESS	Ending position of this field within the record.
8.	CIE-1-OCCURS-FACTOR	How many times this field OCCURS (dictated by 1 or more OCCURS).
9.	CIE-1-REDEFINES-SRC-LINE	Do not use.
10.	CIE-1-REDEFINES-EXP-LINE	For fields containing the REDEFINES clause, this field contains the expanded sequence number of the field being redefined.
11.	CIE-1-ITEM-TYPE	Contains a ‘G’ for group fields.
12.	CIE-1-SECTION-IND	Contains one letter indicating the section where this record or data name is in the Data Division.
13.	CIE-1-TYPE-USAGE	Two characters which indicate USAGE.
14.	CIE-1-CLASS	Contains one character which helps to define numeric or numeric edited fields.
15.	CIE-1-INTEGER-DIGITS	For numeric fields, the number of whole digits to the left of the decimal.
16.	CIE-1-FRACTION-DIGITS	For numeric fields, the number of decimal digits to the right of the decimal.
17.	CIE-1-ALT-OCCURS-NBR-GROUP-6	Do not use.
18.	CIE-1-USE-COMP-FIELD-SW	Contains a ‘Y’ if CIE-1-OCCURS-NBR-TIMES-COMP should be used in place of CIE-1-OCCURS-NBR-TIMES.
19.	CIE-1-OCCURS-NBR-TIMES	The number of OCCURS as indicated within the OCCURS clause.

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Data Analysis Information File

This file is similar to the Data Division Information File and has the PICTURE and VALUE clauses as additional fields.

To produce the file:

1. Use one of the PROCs in the Other COBOL Reports Facility section of this manual (e.g. PROC DCDCOBOL).

2. Use the PROC Symbolic DATA= on the EXEC DCDCOBOL (or other PROC name) line to turn on the DATA PARM option.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK03.

2. The LRECL of the file is 130.

The following pages show the internally used Data Division COPY member that was used to create the file and a description of the related fields within the record.

```
**                          COPY          NRRECORD.
01  NR-1-DATA-DIVISI0N-INFO.
    05  NR-DATA-NAME                          PIC X(30).
    05  NR-PROGRAM-NAME                       PIC X(08).
    05  NR-CMPLR-NBR                          PIC 9(05).
    05  NR-SEQ-NBR                            PIC 9(04).
        88  NR-DATA-DIV-REC                       VALUE 0000.
    05  NR-NARRATIVE.
        10  NR-PICTURE-CLAUSE.
            15  NR-PICTURE-POS1               PIC X(01).
            15  FILLER                        PIC X(20).
        10  NR-VALUE-LITERAL.
            15  NR-OCCURS-NBR                 PIC 9(08).
            15  NR-OCCURS-FACTOR              PIC 9(08).
            15  NR-OCCURS-ALT-END             PIC 9(08).
            15  NR-VALUE-LAST-6               PIC X(06).
        10  NR-LEVEL-NBR                      PIC X(02).
        10  NR-LEVEL-NBR-N      REDEFINES     NR-LEVEL-NBR   PIC 9(02).
        10  NR-FROM-NBR                       PIC 9(06).
        10  NR-TO-NBR                         PIC 9(06).
        10  NR-GROUP-FLAG                     PIC X(01).
            88  NR-GROUP                          VALUE 'G'.
        10  NR-SECTION-IND                    PIC X(01).
            88  NR-SECTION-FILE                   VALUE 'F'.
            88  NR-SECTION-W-S                    VALUE 'W'.
            88  NR-SECTION-LINKAGE                VALUE 'L'.
            88  NR-SECTION-REPORT                 VALUE 'R'.
            88  NR-SECTION-COMM                   VALUE 'C'.
        10  NR-USAGE-IND                      PIC X(02).
            88  NR-USAGE-COMP                     VALUE 'C'.
            88  NR-USAGE-COMP-3                   VALUE 'C3'.
            88  NR-USAGE-COMP-4                   VALUE 'C4'.
            88  NR-USAGE-COMP-5                   VALUE 'C5'.
            88  NR-USAGE-DEFAULT-DISPLAY          VALUE '  '.
            88  NR-USAGE-DISPLAY                  VALUE 'D '.
            88  NR-USAGE-DISPLAY-1                VALUE 'D1'.
            88  NR-USAGE-INDEX                    VALUE 'IX'.
        10  NR-REDEFINES-CMPLR                PIC 9(05).
        10  NR-TYPE-FLAG                      PIC X(01).
            88  NR-TYPE-NORMAL                    VALUE ' '.
            88  NR-TYPE-FILE-NAME                 VALUE 'F'.
            88  NR-TYPE-RECORD-CONTAINS           VALUE 'R'.
            88  NR-TYPE-BLOCK-CONTAINS            VALUE 'B'.
            88  NR-TYPE-LABEL-RECORDS             VALUE 'L'.
            88  NR-TYPE-RECORDS-MODE              VALUE 'M'.
            88  NR-TYPE-SPECIAL-NAMES             VALUE 'S'.
            88  NR-TYPE-88-THROUGH                VALUE 'T'.
        10  NR-CLASS                          PIC X(01).
            88  NR-CLASS-ALPHA                    VALUE 'X'.
            88  NR-CLASS-EDITED                   VALUE 'E'.
            88  NR-TYPE-NUMERIC                   VALUE 'N'.
        10  NR-WHOLE-DIGITS                   PIC 9(02).
        10  NR-FRACTION-DIGITS                PIC 9(02).
        10  NR-OCCURS-NBR-PRESENT-SW          PIC X(01).
            88  NR-OCCURS-NBR-PRESENT             VALUE 'Y'.
        10  NR-SELECT-BY-CTL-CDS-SW           PIC X(01).
            88  NR-SELECT-BY-CTL-CDS              VALUE 'Y'.
        10  NR-VALUE-ALL-SW                   PIC X(01).
            88  NR-VALUE-ALL                      VALUE 'Y'.
```

Exhibit 2

COPY Member for the Data Analysis Information File

Description of Individual Fields

The fields in this record are used to print the first line for each Data Division field in the System Data Name Cross -Reference. See the report for the example of these fields.

Most of the fields here are described under the heading, “Data Division Information File” NR-FROM-NBR and NR-TO-NBR correspond to CIE-START-ADDRESS and CIE-1-END-ADDRESS respectively. Refer to that heading for a description of most fields.

The following fields are new to this record:

The field NR-PICTURE-CLAUSE contains the first 21 characters [e.g. X(15), 9(02), ZZ,ZZ9] coded within the PICTURE clause.

The field NR-VALUE-LITERAL contains the first 30 characters of literals coded within the VALUE clause. This field also contains numbers indicating the number of OCCURS for fields with no VALUE that are within an OCCURS clause.

The field NR-SELECT-BY-CTL-CDS indicates the use of the DAS option which limits the DATA Analysis Reports to just those records selected by the SRA control cards.

The field NR-VALUE-ALL indicates the presence of the word ALL prior to the VALUE literal.

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Procedure Division Information File

This file has one or more records for each Procedure Division statement and contains information relevant to those statements.

To produce the file:

1. Use on of the PROCs in the Alternate Compile Listing Facility section of this manual (e.g. PROC DCDACL).

2. Use SOURCE=NO as a PROC Symbolic on the EXEC DCDACL (or other PROC name) line to turn off the SOURCE PARM option.

3. All other report options must be on. This is normally the default.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK05.

2. The LRECL of the file is 120.

The following pages show the internally used Data Division COPY member that was used to create the file and a description of the related fields within the record.

```
**                          COPY   INFOTYP6                  (IN6)
01    CIE-6-PROCEDURE-DIV-INFO.
      05  CIE-6-TYPE-RECORD                          PIC 9.
          88  CIE-6-TYPE-NORMAL                            VALUE 0.
          88  CIE-6-TYPE-QUAL-1                            VALUE 1.
          88  CIE-6-TYPE-QUAL-2                            VALUE 2.
          88  CIE-6-TYPE-ASSOC-NAME-QUALS                  VALUE 7.
          88  CIE-6-TYPE-SUBSCRIPT-QUALS                   VALUE 8.
          88  CIE-6-TYPE-SUBSCRIPT-INDEX                   VALUE 9.

      05  CIE-6-QUAL-NUMBER                          PIC 99.
          88  CIE-6-VALID-VALUES                           VALUES ARE 00
                                                               THRU 50.
      05  CIE-6-PROC-SOURCE-LINE-NUMBER              PIC 9(5).
      05  CIE-6-PROC-EXP-LINE-NUMBER                 PIC 9(5).

      05  CIE-6-DATA-1-NAME                          PIC X(30).
      05  CIE-6-DATA-2-NAME                          PIC X(30).

      05  CIE-6-NON-CICS-FORMAT-1.
          10  CIE-6-REFERS-DATA-NAME-1-OR-2          PIC X.
          10  CIE-6-PROC-LTRL-LINE-NUMBER            PIC 9(5).
          10  CIE-6-PROC-LTRL-COLUMN-NUMBER          PIC 9(5).
      05  CIE-6-CICS-FORMAT-1  REDEFINES  CIE-6-NON-CICS-FORMAT-1.
          10  CIE-6-IND-CICS-OR-DL1                  PIC X.
              88  CIE-6-IND-FOR-CICS                       VALUE 'C'.
              88  CIE-6-IND-FOR-DL1                        VALUE 'D'.
              88  CIE-6-IND-FOR-SQL                        VALUE 'S'.
          10  CIE-6-CICS-VERB                        PIC X(10).

      05  CIE-6-VERB-CODE                            PIC 999.
      05  CIE-6-TYPE-ACTIVITY                        PIC X.
          88  CIE-6-MODIFIED                               VALUE 'M'.
          88  CIE-6-USED                                   VALUE 'U'.
          88  CIE-6-COMPARED                               VALUE 'C'.
          88  CIE-6-SUBSCRIPT                              VALUE 'S'.
          88  CIE-6-INDEX                                  VALUE 'I'.
      05  CIE-6-COMPARE-OPERATOR                     PIC X.
          88  CIE-6-OPER-EQUAL TO                          VALUE '='.
          88  CIE-6-OPER-GREATER-THAN                      VALUE '>'.
          88  CIE-6-OPER-LESS-THAN                         VALUE '<'.
          88  CIE-6-OPER-IS-NUMERIC                        VALUE 'N'.
          88  CIE-6-OPER-IS-ZERO                           VALUE 'Z'.
          88  CIE-6-OPER-IS-POSITIVE                       VALUE 'P'.
          88  CIE-6-OPER-IS-NEGATIVE                       VALUE 'G'.
          88  CIE-6-OPER-IS-KANJI                          VALUE 'K'.
          88  CIE-6-OPER-IS-ALPHABETIC                     VALUE 'A'.
          88  CIE-OPER-88-OR-OTHER                         VALUE SPACE.
      05  CIE-6-ALL-INDICATOR                        PIC X.
          88  CIE-6-ALL-INDICATED                          VALUE 'A'.
      05  CIE-6-CORR-INDICATOR                       PIC X.
          88  CIE-6-CORR-INDICATED                         VALUE 'C'.
      05  CIE-6-DATA-1-ACTUAL-EXP-NBR                PIC 9(5).
      05  CIE-6-DATA-1-ACTUAL-COL-NBR                PIC 99.
      05  CIE-6-DATA-2-ACTUAL-EXP-NBR                PIC 9(5).
      05  CIE-6-DATA-2-ACTUAL-COL-NBR                PIC 99.
```

Exhibit 3
COPY Member for the Procedure Division Information File **(continued on next page)**

```
05      CIE-6-NON-CICS-FORMAT-2.
   10   CIE-6-NOT-INDICATOR                PIC X.
           88  CIE-6-NOT-BEFORE-A                    VALUE 'A'.
           88  CIE-6-NOT-BEFORE-B                    VALUE 'B'.
   10   CIE-6-EXHIBIT-FORM                 PIC X.
           88  CIE-6-EXHIBIT-NAMED                   VALUE 'N'.
           88  CIE-6-EXHIBIT-CHANGED                 VALUE 'C'.
           88  CIE-6-EXHIBIT-CHANGED-NAME            VALUE 'B'.
   10   CIE-6-EXAMINE-FORM                 PIC X.
           88  CIE-6-EXAMINE-TALLYING                VALUE 'T'.
           88  CIE-6-EXAMINE-REPLACING               VALUE 'R'.
           88  CIE-6-EXAMINE-BOTH                    VALUE 'B'.
   10   CIE-6-GIVING-REMAINDER-SW          PIC X.
           88  CIE-6-GIVING                          VALUE 'G'.
           88  CIE-6-REMAINDER                       VALUE 'R'.
   10   CIE-6-INTO-BY-SW                   PIC X.
           88  CIE-6-INTO                            VALUE 'I'.
           88  CIE-6-BY                              VALUE 'B'.
           88  CIE-6-WITH-POINTER                    VALUE 'P'.
   10   CIE-6-OPEN-TYPE                    PIC X.
           88  CIE-6-OPEN-INPUT                      VALUE 'I'.
           88  CIE-6-OPEN-I-O                        VALUE 'B'.
           88  CIE-6-OPEN-OUTPUT                     VALUE 'O'.
           88  CIE-6-OPEN-EXTEND                     VALUE 'E'.
   10   CIE-6-SET-TYPE                     PIC X.
           88  CIE-6-SET-TO                          VALUE 'T'.
           88  CIE-6-SET-UP                          VALUE 'U'.
           88  CIE-6-SET-DOWN                        VALUE 'D'.
   10   CIE-6-INSPECT-FORM                 PIC X.
           88  CIE-6-INSPECT-TALLYING                VALUE 'T'.
           88  CIE-6-INSPECT-REPLACING               VALUE 'R'.
           88  CIE-6-INSPECT-BOTH                    VALUE 'B'.
           88  CIE-6-INSPECT-CONVERTING              VALUE 'C'.
   10   CIE-6-INSPECT-INITIAL-SW           PIC X.
           88  CIE-6-INSPECT-BEFORE                  VALUE 'B'.
           88  CIE-6-WRITE-BEFORE                    VALUE 'B'.
           88  CIE-6-INSPECT-AFTER                   VALUE 'A'.
           88  CIE-6-WRITE-AFTER                     VALUE 'A'.
   10   CIE-6-SORT-MERGE-SW                PIC X.
           88  CIE-6-SORT-MERGE-VALID-KEYS           VALUE 'A'.
                                                           'D'.
           88  CIE-6-SORT-MERGE-ASCENDING            VALUE 'A'.
           88  CIE-6-SORT-MERGE-DESCENDING           VALUE 'D'.
           88  CIE-6-SORT-MERGE-USING                VALUE 'U'.
           88  CIE-6-SORT-MERGE-GIVING               VALUE 'G'.
   10   CIE-6-SEND-WITH-SW                 PIC X.
           88  CIE-6-SEND-WITH-ESI                   VALUE 'S'.
           88  CIE-6-SEND-WITH-EMI                   VALUE 'M'.
           88  CIE-6-SEND-WITH-EGI                   VALUE 'G'.
           88  CIE-6-SEND-WITH-IDENT                 VALUE 'I'.
   10   CIE-6-INITIALIZE-SW      REDEFINES      CIE-6-SEND-WITH-SW
                                               PIC X(1).
           88  CIE-6-INIT-NO-OPERAND-2               VALUE '0'.
           88  CIE-6-INIT-REPL-ALPHABETIC            VALUE '1'.
           88  CIE-6-INIT-REPL-ALPHANUMERIC          VALUE '2'.
           88  CIE-6-INIT-REPL-NUMERIC               VALUE '3'.
           88  CIE-6-INIT-REPL-ALPHANU-EDITED        VALUE '4'.
           88  CIE-6-INIT-REPL-NUMERIC-EDITED        VALUE '5'.
           88  CIE-6-INIT-REPL-EGCS                  VALUE '6'.
```

Exhibit 3

COPY Member for the Procedure Division Information File
(Continued)

```
10  CIE-6-UNSTRING-SW                       PIC X.
        88  CIE-6-UNSTR-DELIMITED-BY            VALUE 'D'.
        88  CIE-6-UNSTR-INTO                    VALUE 'I'.
        88  CIE-6-UNSTR-DELIMITER-IN            VALUE 'L'.
        88  CIE-6-UNSTR-COUNT-IN                VALUE 'C'.
        88  CIE-6-UNSTR-WITH-POINTER            VALUE 'P'.
        88  CIE-6-UNSTR.-TALLYING               VALUE 'T'.
    10  CIE-6-CALL-ENTRY-UTIL-SW            PIC X(1).
        88  CIE-6-9-P-D-USING-ENTRY             VALUE 'P'.
    10  CIE-6-VARYING-FROM-BY-SW            PIC X(1).
        88  CIE-6-P-D-VARYING                   VALUE 'V'.
        88  CIE-6-P-D-VARYING-FROM              VALUE 'F'.
        88  CIE-6-P-D-VARYING-FROM-BY           VALUE 'B'.
    10  FILLER                              PIC X(1).
05  CIE-CICS-FORMAT-2      REDEFINES    CIE-6-NON-CICS-FORMAT-2.
    10  CIE-6-CICS-OPERAND                  PIC X(15).
```

Exhibit 3

COPY Member for the Procedure Division Information File

(Continued from previous page)

Table of Verb Codes

001	=	MOVE	034	=	UNSTRING
002	=	IF	035	=	PROGRAM-ENTRY
003	=	READ	036	=	CALL
004	=	WRITE	037	=	RESERVED-GO-TO-DEPENDING
005	=	ACCEPT	038	=	VARYING
006	=	ADD	039	=	AFTER
007	=	SUBTRACT	040	=	INITIALIZE
008	=	MULTIPLY	041	=	TIMES
009	=	DIVIDE	042	=	ON
010	=	COMPUTE	043	=	EVALUATE
011	=	CLOSE	044	=	EVALUATE-WHEN
012	=	DELETE	046	=	EXEC
013	=	DISPLAY	047	=	COPY
014	=	EXAMINE	050	=	PARAGRAPH-SECTION-NAME
015	=	EXHIBIT	051	=	ALTER
016	=	REWRITE	052	=	CANCEL
017	=	RELEASE	053	=	EXIT
018	=	RETURN	054	=	GO
019	=	WHEN	055	=	GOBACK
020	=	UNTIL	056	=	PERFORM
021	=	HANDLE-SUBSCRIPT	057	=	STOP
022	=	OPEN	060	=	INITIATE
023	=	SET	061	=	GENERATE
024	=	INSPECT	062	=	TERMINATE
025	=	MERGE	063	=	CONTROL-IN-RWRD
026	=	RECEIVE	064	=	RESET-IN-RW0149
027	=	SEARCH	065	=	SOURCE-IN-RW0149
028	=	SEND	066	=	SUM-IN-RW0149
029	=	SORT	067	=	SUM-UPON-IN-RW0149
030	=	START	068	=	TYPE-CH-IN-RW0149
031	=	SEEK	069	=	TYPE-CF-IN-RW0149
032	=	STRING			
033	=	TRANSFORM			

NOTE: Numbers are not completely contiguous. See CIE-6-VERB-CODE for a description of the field.

Description of Individual Fields

1.	CIE-6-TYPE-RECORD	An indicator showing the type of data name this record covers (regular qualification of a data name, qualification for a subscript or a subscript on an index). Ignore type 7 records.
2.	CIE-6-QUAL-NUMBER	For qualification records, this number shows the level of qualification (first, second, etc.).
3.	CIE-6-SOURCE-LINE-NUMBER	Do not use.
4.	CIE-6-EXP-LINE-NUMBER	The expanded sequence number (after COPY members has been resolved and brought into the program) where this data field is in the program.
5.	CIE-6-DATA-1-NAME	The syntax of every Procedure Division statement is broken into one or more groupings where one or two data names are directly involved. This field represents the first data name or literal. (For example: MOVE A TO B.) Note: Literals are truncated to 28 characters.
6.	CIE-6-DATA-2-NAME	This field will be blank or will contain the second data name.
7.	CIE-6-NON-CICS-FORMAT-1	Do not use.
8.	CIE-6-CICS-FORMAT-1	This field has information from CICS, DL1 or SQL statements.
9.	CIE-6-VERB-CODE	A three-digit code indicating the COBOL verb used in the Procedure Division that caused this record to be generated. See the Table of Verb Codes.
10.	CIE-6-TYPE-ACTIVITY	This code (while using different letters) is similar to the Set/Used/Tested indicators used in the System Record Analysis Report. "M" indicates the field was modified, "U" indicates the field is used to modify another field, "C" indicates a comparison, "S" indicates a subscript and "I" indicates an INDEX.
11.	CIE-6-COMPARE-OPERATOR	This code is filled in for many comparisons to indicate the type of comparison.
12.	CIE-6-ALL-INDICATOR	Do not use.
13.	CIE-6-CORR-INDICATOR	Used to indicate the presence of CORRESPONDING.

14.	CIE-6-DATA-1-ACTUAL-EXP-NBR through CIE-6-DATA-2-ACTUAL-COL-NBR	These represent the actual line number and column number where data names 1 and 2 reside in the source code.
15.	CIE-6-NON-CICS-FORMAT-2	Individual flags which indicate how the verb was coded (i. e. what format of the verb was used).
16.	CIE-6-CICS-FORMAT-2	Contains the first CICS operand.

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Basic Paragraph Information File

This file has basic information on the location of paragraphs and sections and the referencing of those paragraphs through Procedure Division statements.

To produce the file:

1. Use one of the PROCs in the Alternate Compile Listing Facility section of this manual (e.g. PROC DCDACL).

2. Use the following PROC Symbolics on the EXEC DCDACL (or other PROC name) line to turn off all report PARM options as follows:

```
SOURCE=NO,
CALL=NO,
COPY=NO,
FIGCON=NO,
LITERAL=NO,
SPREGS=NO,
CDATADV=NO,
CPROCDV=NO,
OTHER='NOVER,NOIRE'
```

To access the file:

1. The file is available on the file with the DDNAME of DCDWK06.

2. The LRECL of the file is 104.

The following pages show the internally used Data Division COPY member that was used to create the file and a description of the related fields within the record.

```
**                              COPY  PARATYP1                  (PF1)
01  PAR-1-BASIC-PARAGRAPH-INFO.

    05  PAR-1-SOURCE-LINE-NUMBER              PIC 9(5).
    05  PAR-1-EXPANDED-LINE-NUMBER            PIC 9(5).
    05  PAR-1-TOKEN-COLUMN-NUMBER             PIC 9(2).

    05  PAR-1-PARA-OR-SECT                    PIC X(30).

    05  PAR-1-RELEVANT-SECTION                PIC X(30).

    05  PAR-1-VERB-CODE                       PIC  999.
        88  PAR-1-PARAGRAPH-NAME                          VALUE 001.
        88  PAR-1-SECTION-NAME                            VALUE 002.
        88  PAR-1-PRIOR-TOKEN-OF-PARA-SECT                VALUE 005.
        88  PAR-1-LAST-TOKEN-IN-PROGRAM                   VALUE 006.
        88  PAR-1-DECLARATIVES                            VALUE 008.
        88  PAR-1-END-DECLARATIVES                        VALUE 009.
        88  PAR-1-GO-TO                                   VALUE 011.
        88  PAR-1-GO-TO-DEPENDING-ON                      VALUE 012.
        88  PAR-1-PERFORM                                 VALUE 021.
        88  PAR-1-PERFORM-THRU                            VALUE 022.
        88  PAR-1-INPUT-PROCEDURE                         VALUE 025.
        88  PAR-1-INPUT-PROCEDURE-THRU                    VALUE 026.
        88  PAR-1-OUTPUT-PROCEDURE                        VALUE 027.
        88  PAR-1-OUTPUT-PROCEDURE-THRU                   VALUE 028.
        88  PAR-1-ALTER-PARA                              VALUE 031.
        88  PAR-1-ALTER-PARA-TO-PROCEED-TO                VALUE 032.
        88  PAR-1-GOBACK                                  VALUE 041.
        88  PAR-1-STOP-RUN                                VALUE 042.
        88  PAR-1-EXIT-PROGRAM                            VALUE 043.
        88  PAR-1-EXIT                                    VALUE 048.
        88  PAR-1-CALL                                    VALUE 051.
        88  PAR-1-PROGRAM-ENTRY                           VALUE 052.
        88  PAR-1-ENTRY                                   VALUE 053.
        88  PAR-1-CANCEL                                  VALUE 054.
        88  PAR-1-INITIATE                                VALUE 060.
        88  PAR-1-GENERATE                                VALUE 061.
        88  PAR-1-TERMINATE                               VALUE 062.
        88  PAR-1-EXEC-CICS                               VALUE 071.
        88  PAR-1-EXEC-DL1                                VALUE 072.
        88  PAR-1-EXEC-SQL                                VALUE 073.

    05  PAR-1-CONDITIONAL-SW                  PIC X.
        88  PAR-1-CONDITIONAL                             VALUE 'Y'.

    05  PAR-1-MULTIPLE-OPERANDS-SW            PIC X.
        88  PAR-1-MULTIPLE-OPERANDS                       VALUE 'Y'.

    05  PAR-1-NAME-EXP-LINE-NUMBER            PIC 9(5).
    05  PAR-1-NAME-COLUMN-NUMBER              PIC 9(2).
    05  PAR-1-FILLER                          PIC X(20).
```

Exhibit 4

COPY Member for the Basic Paragraph Information File

Description of Individual Fields

1.	PAR-1-SOURCE-LINE-NUMBER	Do not use.
2.	PAR-1-EXPANDED-LINE-NUMBER	An expanded sequence number (after COPY members have been resolved and brought into the program) of a statement number in the Procedure Division representing a paragraph or section, or a statement with a reference to a paragraph or section or external transfer.
3.	PAR-1-TOKEN-COLUMN-NUMBER	The column number of the beginning of the paragraph or verb which references the paragraph.
4.	PAR-1-PARA-OR-SECT	The name of a paragraph, a section or a comment generated to correspond to the code used in PAR-1-VERB-CODE.
5.	PAR-1-RELEVANT-SECTION	The name of the parent section (if one exists) for paragraph records.
6.	PAR-1-VERB-CODE	A three-digit code explaining what verb or condition generated this record.
7.	PAR-1-CONDITIONAL-SW	Used to indicate that the verb causing this record is part of a conditional statement such as READ/ AT END OR IF.
8.	PAR-1-MULTIPLE-OPERANDS-SW	Used to indicate that one of multiple operands is listed and others are not in the paragraph field. An example of this is CALL USING.
9.	PAR-1-NAME-EXP-LINE-NUMBER	An expanded sequence number of the actual paragraph name for verb codes where a paragraph name is used as an operand. Otherwise, this field will be zero.
10.	PAR-1-NAME-COLUMN-NUMBER	A column number which corresponds to the above sequence number.

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Paragraph Range Information File

This file has most of the information in the Basic Paragraph Information File and the beginning and ending sequence numbers showing the range of those paragraphs or sections.

To produce the file:

1. Use one of the PROCs in the Alternate Compile Listing Facility Section of this manual (e.g. PROC DCDACL).

2. Use the PROC Symbolic SOURCE= on the EXEC DCDACL (or other PROC name) line to turn on the SOURCE PARM option. This option is normally already on. Other options may also be left on.

To access the File:

1. The file is available on the file with the DDNAME of DCDWK03.

2. The LRECL of the file is 104.

The following pages show the internally used Data Division COPY member that was used to create the file, and a description of the related fields within the record.

```
**                              COPY  PARATYP2          (PF2)
01  PARA-2-RANGES-FOR-PARAS.

    05  PAR-2-SOURCE-LINE-NUMBER                   PIC 9(5).
    05  PAR-2-EXPANDED-LINE-NUMBER                 PIC 9(2).
    05  PAR-2-TOKEN-COLUMN-NUMBER                  PIC 9(2).

    05  PAR-2-PARA-OR-SECT                         PIC X(30).

    05  PAR-2-RELEVANT-SECTION                     PIC X(30).

    05  PAR-2-VERB-CODE                            PIC  999.

        88  PAR-2-PARAGRAPH-NAME                               VALUE  001.
        88  PAR-2-SECTION-NAME                                 VALUE  002.
        88  PAR-2-PRIOR-TOKEN-OF-PARA-SECT                     VALUE  005.
        88  PAR-2-LAST-TOKEN-IN-PROGRAM                        VALUE  006.
        88  PAR-2-DECLARATIVES                                 VALUE  008.
        88  PAR-2-END-DECLARATIVES                             VALUE  009.
        88  PAR-2-GO-TO                                        VALUE  011.
        88  PAR-2-GO-TO-DEPENDS-ON                             VALUE  012.
        88  PAR-2-PERFORM                                      VALUE  021.
        88  PAR-2-PERFORM-THRU                                 VALUE  022.
        88  PAR-2-INPUT-PROCEDURE                              VALUE  025.
        88  PAR-2-INPUT-PROCEDURE-THRU                         VALUE  026.
        88  PAR-2-OUTPUT-PROCEDURE                             VALUE  027.
        88  PAR-2-OUTPUT-PROCEDURE-THRU                        VALUE  028.
        88  PAR-2-ALTER-PARA                                   VALUE  031.
        88  PAR-2-ALTER-TO-PROCEED-TO                          VALUE  032.
        88  PAR-2-GOBACK                                       VALUE  041.
        88  PAR-2-STOP-RUN                                     VALUE  042.
        88  PAR-2-EXIT-PROGRAM                                 VALUE  043.
        88  PAR-2-EXIT                                         VALUE  048.
        88  PAR-2-CALL                                         VALUE  051.
        88  PAR-2-PROGRAM-ENTRY                                VALUE  052.
        88  PAR-2-ENTRY                                        VALUE  053.
        88  PAR-2-CANCEL                                       VALUE  054.
        88  PAR-2-INITIATE                                     VALUE  060.
        88  PAR-2-GENERATE                                     VALUE  061.
        88  PAR-2-TERMINATE                                    VALUE  062.
        88  PAR-2-EXEC-CICS                                    VALUE  071.
        88  PAR-2-EXEC-DL1                                     VALUE  072.
        88  PAR-2-EXEC-SQL                                     VALUE  073.

    05  PAR-CONDITIONAL-SW                         PIC X.
        88  PAR-2-CONDITIONAL                                  VALUE 'Y'.

    05  PAR-2-MULTIPLE-OPERANDS-SW                 PIC X.
        88  PAR-MULTIPLE-OPERANDS                              VALUE 'Y'.

    05  PAR-2-NAME-EXP-LINE-NUMBER                 PIC 9(5).
    05  PAR-2-NAME-COLUMN-NUMBER                   PIC 9(2).

    05  PAR-2-SOURCE-BEGIN-NBR                     PIC 9(5).
    05  PAR-2-EXPANDED-BEGIN-NBR                   PIC 9(5).

    05  PAR-2-SOURCE-END-NBR                       PIC 9(5).
    05  PAR-2-EXPANDED-END-NBR                     PIC 9(5).
```

Exhibit 5

COPY Member for the Paragraph Range Information File

Description of Individual Fields

1.	PAR-2-SOURCE-LINE-NUMBER	Do not use.
2.	PAR-2-EXPANDED-LINE-NUMBER	An expanded sequence number (after COPY members have been resolved and brought into the program) of a statement number in the Procedure Division representing a paragraph or section or a statement with a reference to a paragraph or section or external transfer.
3.	PAR-2-TOKEN-COLUMN-NUMBER	The column number of the beginning of the paragraph or verb which references the paragraph.
4.	PAR-2-PARA-OR-SECT	The corresponding paragraph or section name.
5.	PAR-2-RELEVANT-SECTION	When PAR-2-PARA-OR-SECT contains a paragraph name, this field will contain the section name that the paragraph name resides in.
6.	PAR-2-VERB-CODE	A three-digit code explaining what verb or condition generated this record.
7.	PAR-2-CONDITIONAL-SW	Used to indicate that the verb causing this record is part of a conditional statement such as READ / AT END or IF.
8.	PAR-2-MULTIPLE-OPERANDS-SW	Used to indicate that one of multiple operands is listed and others are not in the paragraph field. An example of this is CALL USING.
9.	PAR-2-NAME-EXP-LINE-NUMBER	An expanded sequence of the actual paragraph name for verb codes where a paragraph name is used as an operand. Otherwise this field will be zero.
10.	PAR-2-NAME-COLUMN-NUMBER	A column number which corresponds to the above sequence number.
11.	PAR-2-SOURCE-BEGIN-NBR	Do not use.
12.	PAR-2-EXPANDED-BEGIN-NBR	For verbs which make reference to a paragraph or section this field shows the beginning expanded sequence number of the paragraph or section being referenced.
13.	PAR-2-SOURCE-END-NBR	Do not use.
14.	PAR-2-EXPANDED-END-NBR	For verbs that require both begin and end sequence numbers, (e.g. PERFORM), this field shows the ending expanded sequence number.

Transfer of Control Narrative File

This file has a narrative showing transfer of control information for paragraphs, sections and transfer of control statements such as CALL, PERFORM and GO TO.

To produce the file:

1. Use one of the PROCs in the Alternate Compile Listing Facility section of this manual (e.g. PROC DCDACL).

2. Use the PROC Symbolic SOURCE= on the EXEC DCDACL (or other PROC name) line to turn on the SOURCE PARM option. This is normally the default. Other options may be left on.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK04.

2. The LRECL of the file is 40.

The following page shows the internally used Data Division COPY member that was used to create the file, and a description of the related fields within the record.

```
**                          COPY   PARATYPE3.      (PF3)

01  PAR-3-NARRATIVE-FOR-SRC-LIST

    05  PAR-3-EXPANDED-LINE-NUMBER          PIC 9(5).
    05  PAR-3-NARRATIVE                     PIC X(34).
    05  PAR-3-FILLER                        PIC X(1).
```

Exhibit 6

COPY Member for the Transfer of Control Narrative File

Description of Individual Fields

1. PAR-3-EXPANDED-LINE-NUMBER — An expanded sequence number of the Procedure Division statement for which the narrative is for.
2. PAR-3-NARRATIVE — Transfer of control narrative belonging to the COBOL verb in the Procedure Division statement referenced by the expanded line number.

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Procedure Division References to the Data Division

This file is a narrative file showing the references for each Procedure Division line back to the Data Division.

To produce the file:

1. Use one of the PROCs in the Alternate Compile Listing Facility Section of this manual (e.g. PROC DCDACL).

2. Use the PROC Symbolic SOURCE= on the EXEC DCDACL (or other PROCname) line to turn on the SOURCE PARM option. This is normally the default. Other options may be left on.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK02.

2. The LRECL of the file is 52.

The following pages show the internally used Data Division COPY member that was used to create the file, and a description of the related fields within the record.

```
01  RR-WORK-RECORD.
    05  RR-P-D-CPMLR-NBR                PIC 9(5).
    05  RR-NARR-LENGTH                  PIC 99.

    05  RR-SQ-NBR-WORK-AREA.
        10  RR-DATA-DIV-SQ-NBRS-6       OCCURS  7  TIMES.
            15  RR-DATA-DIV-CMPLR-6     PIC ZZZZ99.
        10  FILLER                      PIC XX.

    05  RR-WORK-AREA-2  REDEFINES       RR-SQ-NBR-WORK-AREA.
        10  RR-DATA-DIV-SQ-NBRS-5       OCCURS  8  TIMES
            15  RR-DATA-DIV-CMPLR-5     PIC ZZZ99.
        10  FILLER                      PIC X(4).
    05  RR-WORK-AREA-3  REDEFINES       RR-SQ-NBR-WORK-AREA.
        10  RR-DATA-DIV-SQ-NBRS-4       OCCURS  10 TIMES.
            15  RR-DATA-DIV-CMPLR-4     PIC ZZ99.
        10  FILLER                      PIC X(4).

    05  RR-WORK-AREA-4  REDEFINES       RR-SQ-NBR-WORK-AREA.
        10  RR-DATA-DIV-SQ-NBRS-3       OCCURS  14 TIMES.
            15  RR-DATA-DIV-CMPLR-3     PIC Z99.
        10  FILLER                      PIC X(2).

    05  RR-WORK-AREA-5  REDEFINES       RR-SQ-NBR-WORK-AREA.
        10  RR-POS                      OCCURS  44 TIMES.
                                        PIC X.
    05  RR-WORK-AREA-6  REDEFINES       RR-SQ-NBR-WORK-AREA.
        10  FILLER                      PIC X(29).
        10  RR-CA3-FINAL-5-POS          PIC ZZZZ99.
        10  RR-CA3-LAST-CHAR            PIC X(01).
        10  FILLER                      PIC X(01).
        10  RR-FINAL-5-POS              PIC ZZZZ99.
        10  RR-LAST-CHAR                PIC X(01).

    05  RR-WORK-AREA-7  REDEFINES       RR-SQ-NBR-WORK-AREA.
        10  FILLER                      PIC X(30).
        10  RR-CA3-FINAL-4-POS          PIC ZZZ99.
        10  FILLER                      PIC X(03).
        10  RR-FINAL-4-POS              PIC ZZZ99.
        10  FILLER                      PIC X(01).

    05  RR-WORK-AREA-8  REDEFINES       RR-SQ-NBR-WORK-AREA.
        10  FILLER                      PIC X(31).
        10  RR-CA3-FINAL-3-POS          PIC ZZ99.
        10  FILLER                      PIC X(04).
        10  RR-FINAL-3-POS              PIC ZZ99.
        10  FILLER                      PIC X(01).

    05  RR-LAST-FILLER                  PIC X.
```

Exhibit 7

COPY Member for Procedure Division References to the Data Division

Description of Individual Fields

1. RR-P-D-CMPLR-NBR	An expanded sequence number (after COPY members have been resolved and brought into the program) of a statement in the Procedure Division which has references to the Data Division.
2. RR-NARR-LENGTH	The length in characters of the narrative that follows in the next field.
3. RR-SQ-NBR-WORK-AREA	This is an area where numbers representing references back to the Data Division are placed. The numbers will have only as many digits reserved for the number as the largest sequence number is present in the Data Division with a minimum of 2 digits. One Space is left between all numbers. In cases where smaller numbers are present, more than one space will be used. The best example of this field is by looking at this file after running a user's COBOL program through DCD IV.

Procedure Division Narrative for Each Data Field

This file has a narrative for each Data Division field showing all Procedure Division references to this field. The length of the narrative is 43 characters.

To produce the file:

1. Use one of the PROCs in the Alternate Compile Listing Facility section of this manual (e.g. PROC DCDACL).

2. Use the PROC Symbolic SOURCE= on the EXEC DCDACL (or other PROC name) line to turn on the SOURCE PARM option. This option is normally already on. Other options may be left on.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK05.

2. The LRECL of file is 60.

The following page shows the internally used Data Division COPY member that was used to create the file, and a description of the related fields within the record.

```
01  NR-RECORD
    05  NR-CMPLR-NBR          PIC 9(5).
    05  NR-NARRATIVE          PIC X(55).
```

Exhibit 8

COPY Member for Procedure Division Narrative for Each Data Field

Description of Individual Fields

1. NR-CMPLR-NBR — An expanded sequence number of the Data Division statement for which the narrative is for.
2. NR-NARRATIVE — COBOL narrative belonging to the data name indicated by the sequence number above.

Expanded Procedure Division Narrative

This file has a narrative for each Data Division field showing all Procedure Division references to this field. The length of the narrative is 83 characters.

To produce the file:

1. Use one of the PROCs in the Other COBOL Reports Facility section of this manual (e.g. PROC DCDCOBOL).

2. Use the PROC Symbolic DATA= on the EXEC DCDCOBOL (or other PROC name) line to turn on the DATA PARM option.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK05.

2. The LRECL of the file is 130.

The following page shows the internally used Data Division COPY member that was used to create the file, and a description of the related fields within the record.

```
01  NR-RECORD.
    05  NR-DATA-NAME          PIC  X(30)
    05  NR-PROGRAM-NAME       PIC  X(08).
    05  NR-CMPLR-NBR          PIC  9(05).
    05  NR-SEQ-NBR            PIC  9(04).
    05  NR-NARRATIVE          PIC  X(83).
```

Exhibit 9

COPY Member for the Expanded Procedure Division Narrative

Description of Individual Fields

1.	NR-DATA-NAME	Data name that the COBOL narrative is for.
2.	NR-PROGRAM-NAME	COBOL program-id.
3.	NR-CMPLR-NBR	Expanded sequence number.
4.	NR-SEQ-NBR	A number from 1 to 9999, re-starting at 1 for every data name.
5.	NR-NARRATIVE	The COBOL narrative that appears on the System Data Name Cross-Reference.

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Data Dictionary Interface File

This file produces the same information produced on the System Record Analysis Report. Specifically, direct and indirect flags are available which show data movement and comparison for each field within selected records.

To produce the file:

1. See the heading, "**Data Dictionary Interface File**", in the Other COBOL Reports Facility section. Control statements are required.

To access the file:

1. The file is available on the file with the DDNAME of DCDDICT.

2. The LRECL of the file is 120.

The following pages show the internally used Data Division COPY member that was used to create the file, and a description of the related fields within the record.

```
**                    COPY          SYS1RECD

01   SRA-SYSTEM-RECORD-ANAL-REC.
     05   SRA-SET-NUMBER                  PIC999.
     05   SRA-FROM-TO-LOCATIONS.
          10   SRA-FROM-POSITION          PIC  9(6).
          10   SRA-TO-POSITION            PIC  9(6).
     05   SRA-PROGRAM-ID                  PIC  X(8).
     05   SRA-RECORD-NAME                 PIC  X(30).
     05   SRA-DATA-NAME                   PIC  X(30).
     05   SRA-EXP-CMPLR-NBR               PIC  9(5).
     05   SRA-LEVEL-NUMBER                PIC  XX.
     05   SRA-TYPE-USAGE                  PIC  X(2).
          88   SRA-TYPE-COMP                              VALUE  'C '.
          88   SRA-TYPE-COMP-1                            VALUE  'C1'.
          88   SRA-TYPE-COMP-2                            VALUE  'C2'.
          88   SRA-TYPE-COMP-3                            VALUE  'C3'.
          88   SRA-TYPE-COMP-4                            VALUE  'C4'.
          88   SRA-TYPE-DEFAULT-DISPLAY                   VALUE  '  '.
          88   SRA-TYPE-DISPLAY                           VALUE  'D '.
          88   SRA-TYPE-DISPLAY-1                         VALUE  'D1'.
          88   SRA-TYPE-INDEX                             VALUE  'IX'.
          88   SRA-TYPE-USAGE-IS-INDEX                    VALUE  'UI'.
          88   SRA-TYPE-POINTER                           VALUE  'PR'.
     05   SRA-FLAGS.
          10   SRA-SET-FLAG               PIC  X.
               88   SRA-DIRECT-SET                        VALUE  'S'.
          10   SRA-USED-FLAG              PIC  X.
               88   SRA-DIRECT-USED                       VALUE  'U'.
          10   SRA-TESTED-FLAG            PIC  X.
               88   SRA-DIRECT-TESTED                     VALUE  'T'.
          10   SRA-INDIR-SET-FLAG         PIC  X.
               88   SRA-INDIRECT-SET                      VALUE  'S'.
          10   SRA-INDIR-USED-FLAG        PIC  X.
               88   SRA-INDIRECT-USED                     VALUE  'U'.
          10   SRA-INDIR-TESTED-FLAG      PIC  X.
               88   SRA-INDIRECT-TESTED                   VALUE  'T'.
     05   SRA-PICTURE-CLAUSE               PIC  X(21).
     05   SRA-FILLER                      PIC  X.
```

Exhibit 10

COPY Member for the Data Dictionary Interface File

Description of Individual Fields

1. SRA-SET-NUMBER — Sequential number starting at 1 showing which set of control cards produced this set of records.

2. SRA-FROM-TO-LOCATIONS — From and to record positions for this data name.

3. SRA-DATA-ID — Taken from the program-id in the Identification Division.

4. SRA-RECORD-NAME — The name of the 01 record which contains this data name.

5. SRA-DATA-NAME — Self-explanatory.

6. SRA-EXP-CMPLR-NBR — Compiler number or sequence number in the program of this data name.

7. SRA-LEVEL-NUMBER — 01-49 level number associated with this data name.

8. SRA-TYPE-USAGE — USAGE of this data name.

9. SRA-FLAGS — Contains flags showing how this data field is used in the program.

   Direct flags indicate this field was involved in the Procedure Division statement, which caused this flag.

   Indirect flags indicate this field was not involved in the Procedure Division statement, which caused this flag.

   SET indicates that this is changed.
   USED indicates that this field was used to modify, in some way, another field.
   TESTED indicates that this field was used in a comparison.

10. SRA-PICTURE-CLAUSE — The first 21 characters of the PICTURE clause associated with this data name.

11. SRA-FILLER — Not used at this time.

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PICTURE and Literal File

This file contains information on PICTURES, VALUE literals and literals used in the Procedure Division.

To produce the file:

1. Use one of the PROCs in the Alternate Compile Listing Facility Section of this manual (e.g. PROC DCDACL).

2. Use SOURCE=NO as a PROC Symbolic on the EXEC DCDACL (or other PROC name) line to turn off the SOU PARM option.

3. All other report options must be on. This is normally the default.

To access the file:

1. The file is available on the file with the DDNAME of DCDWK02.

2. The LRECL of the file is 104.

The following pages show the internally used Data Division COPY member that was used to create the file, and a description of the related fields within the record.

```
**                              COPY        INFOTYP3        (IN3)
01  CIE-3-PICTURE-LITERAL-INFO.
    05  CIE-3-SOURCE-LINE-NUMBER           PIC 9(5).
    05  CIE-3-EXPANDED-LINE-NUMBER         PIC 9(5).

    05  CIE-3-FIELD-COLUMN-NUMBER          PIC 9(2).

    05  CIE-3-TYPE-CHANGE-IND              PIC X.
        88  CIE-3-CHANGE-PICTURE                       VALUE 'P'.
        88  CIE-3-CHANGE-LITERAL                       VALUE 'L'.
        88  CIE-3-CHANGE-RECORD                        VALUE 'R'.
        88  CIE-3-CHANGE-BLOCK                         VALUE 'B'.
        88  CIE-3-LITERAL-FOR-ELEM                     VALUE '5'.
        88  CIE-3-LITERAL-FOR-88                       VALUE '8'.
        88  CIE-PICTURE-FOR-ELEM                       VALUE 'C'.
        88  CIE-3-COPY-STATEMENT                       VALUE 'Q'.
        88  CIE-3-COPY-FOLLOW-REC                      VALUE 'V'.
        88  CIE-3-SYS-FIG-CONST                        VALUE 'F'.
        88  CIE-3-SYS-SP-REG                           VALUE 'S'.

    05  CIE-3-OLD-FIELD-LENGTH             PIC 9(5).
    05  CIE-3-AMT-OF-FIELD-INCREASE        PIC 9(2).
    05  CIE-EXPANSION-INFORMATION.
        10  CIE-3-EXPANSION-CODE           PIC 9(3).
            88  CIE-3-EXPANSION-CODE-IGNORED           VALUE 000.
        10  CIE-3-EXPANSION-BEGIN-POS      PIC 99.
        10  CIE-3-EXPANSION-END-POS        PIC 99.

    05  CIE-3-DIVISION-INDICATOR           PIC X.
        88  CIE-3-ID-DIVISION                          VALUE 'I'.
        88  CIE-3-ENVIRONMENT-DIVISION                 VALUE 'E'.
        88  CIE-3-DATA-DIVISION                        VALUE 'D'.
        88  CIE-3-PROCEDURE-DIVISION                   VALUE 'P'.

    05  CIE-3-DATA-NAME                    PIC X(30).

    05  CIE-3-COPY-MEMBER-NAME             PIC X(8).

    05  CIE-3-PROGRAM-ID-NAME              PIC X(8).

    05  CIE-3-SOU-DATA-NAME-LINE-NBR       PIC 9(5).

    05  CIE-3-EXP-DATA-NAME-LINE-NBR       PIC 9(5).

    05  CIE-3-LEVEL-NUMBER                 PIC 99.

    05  CIE-3-ALL-LITERAL-SW               PIC X.
        88  CIE-3-ALL-LITERAL                          VALUE 'Y'.

    05  CIE-3-COPY-SUPPRESS-SW             PIC X.
        88  CIE-3-COPY-SUPPRESS                        VALUE 'S'.

    05  CIE-3-COPY-REPLACING-SW            PIC X.
        88  CIE-3-COPY-REPLACING                       VALUE 'R'.

    05  CIE-3-VALUE-THRU-SW                PIC X.
        88  CIE-3-VALUE-THRU                           VALUE 'T'.

    05  CIE-3-FILLER-TO-104                PIC X(14)
```

Exhibit 11

COPY Member for the PICTURE and Literal File

Description of Individual Fields

1.	CIE-3-SOURCE-LINE-NUMBER	Do not use.
2.	CIE-3-EXPANDED-LINE-NUMBER	The expanded sequence number (after COPY members have been resolved and brought into the program) of the actual line containing the literal or PICTURE clause.
3.	CIE-3-FIELD-COLUMN-NUMBER	The column number on this line where the PICTURE or literal begins.
4.	CIE-3-TYPE-CHANGE-IND	A code indicating the type of information stored on this record. The "P" code will appear in this record as a "C". The "L" code will appear (for the Data Division) as a "5" or "8".
5.	CIE-3-OLD-FIELD-LENGTH	Do not use.
6.	CIE-3-AMT-OF-FIELD-INCREASE	Do not use.
7.	CIE-3-EXPANSION-INFORMATION	Do not use.
8.	CIE-3-DIVISION-INDICATOR	Indicates what division this record comes from.
9.	CIE-3-DATA-NAME	The PICTURE clause or actual literal.
10.	CIE-3-COPY-MEMBER-NAME	If this field is part of a COPY member, then the COPY member name is shown here.
11.	CIE-3-PROGRAM-ID-NAME	The program-id from this COBOL program.
12.	CIE-3-SOU-DATA-NAME-LINE-NBR	Do not use.
13.	CIE-3-EXP-DATA-NAME-LINE-NBR	The expanded sequence number of the level number that belongs to and represents this PICTURE or literal.
14.	CIE-3-LEVEL-NUMBER	The level number.
15.	CIE-3-ALL-LITERAL-SW	Do not use.
16.	CIE-3-COPY-SUPPRESS-SW	Used to indicate the use of SUPPRESS on a COPY statement.
17.	CIE-3-COPY-REPLACING-SW	Used to indicate the use of REPLACING on a COPY statement.
18.	CIE-3-VALUE-THRU-SW	Indicates the presence of an ALL before the literal.

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Release 4.0

DCD IV

JCL PROC Analysis Reports

Facility

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DCD IV

JCL PROC Analysis Reports Facility

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Use of This Section

This section is provided to make the user aware of reports which are available for JCL analysis.

Explanation of JCL PROC Analysis Reports

The JCL PROC Analysis Reports Facility produces JCL analysis reports on either JCLPROC libraries or JCL JOB libraries. See, “Sample Reports”, under this heading for a sample of these reports.

The DCDJCL PROC explained in this section contains two steps. The first step isolates the wanted JCL members from a partitioned data set. This first step is the same program that is executed by the MBRFETCH PROC described in another section of this manual. The second step executes the program to print the JCL PROC Analysis Reports for either a PROC library or a JOB library.

A PROC library is defined as a library with existing PROCs or other JCLs which contain EXEC PGM= and DD statements.

A JOB library is defined as a library with JOB cards and EXEC proc-member-name statements.

User Options Available

There are two basic JCL Analysis Reports:

The first report is the JOBLIB report showing only two fields – JOB name and PROC name. The report when run will be listed in two sequences – 1) by JOB name and 2) by PROC name. To run, specify RPTYPE=JOBLIB on the EXEC line. Do not specify other report or J-options when running this report. LNCNT and SORTREG symbolics may be used here.

A sample EXEC line for the JOBLIB report is shown below:

```
//STEP1          EXEC     DCDJCL,RPTYPE=JOBLIB,LNCNT=60
```

The second report is the PROC or basic JCL report which shows a breakdown of user JCL for DDNAME, DSN & DISPOSITION along with related program name, proc name, step name and step number. There are three sequences to this report and several other related options.

The three sequences are:

1. DDNAME sequence
2. DSNAME sequence
3. Unsorted sequence

To produce any of these sequences, enter one of the following symbolics on the EXEC DCDJCL statement:

1. RPTYPE=DDN
2. RPTYPE=DSN
3. RPTYPE=JNOSORT
4. RPTYPE=JCL (for all three reports)

To produce any two of the reports, specify two reports options in the RPTYPE symbolic within single apostrophes as shown in this example:

RPTYPE='DDN,JNOSORT'

Other Options

JDSNONLY — When the DSNAME is missing from a DD and replaced with the use of DATA, DUMMY, SYSOUT=, DDNAME= or *, these fields will be shown as the related DSN. To exclude these DD statements, use the JDSNONLY option within the RPTYPE= symbolic within single apostrophes along with the report options selected. (Note options may be abbreviated to the first three characters).

JAPROC — Without the use of this option or the JBPROGRAM option, the three different reports will have no primary sort ahead of DDNAME, DSNAME or DDNAMES in their unsorted order within each EXEC. Using this option will sort the JCL report with PROC name as the primary (first) sort field.

JBPROGRAM — See the JAPROC option. When this option is used, the report will be sorted on program name ahead of DDNAME, DSNAME or DDNAMES in their unsorted order within each EXEC. If JAPROC is also used with this option, the PROC name for the JAPROC option will be sorted first. The program name for this JBPROGRAM option will be second, followed by DDNAME, or the unsorted DDNAME order.

JEXEC — PROC name and PROGRAM will not be shown normally if there are no DDNAMES that follow a PROC or PROGRAM name. Using this JEXEC option will force out the PROC name and/or PROGRAM name even if no DDNAMES are present. Using this option with the DSN or DDN option will cause PROGRAM/PROC records with blank DDNAME and blank DSNAME to appear at the front of the report or scattered throughout the report depending on the use of the JAPROC and JBPROGRAM option.

Example using additional options

```
//STEP1   EXEC    DCDJCL,RPTYPE='DDNAME,DSNAME,JDSN,JAP,JEX'
```

Other options for either report type

The other options that are available are number of lines per page (LNCNT=) and SORT region size (SORTREG=). The default for these are LNCNT=60 and SORTREG=600000.

Use of Control Statements for Selection of PROCs

The first step in producing a JCL PROC Analysis Report is the selection of JCL members. This is accomplished through the use of a member fetcher PROC which isolates and selects members off of a partitioned data set.

The DD name for these control statements is CTLCDMBR.

Control statements must be used to indicate which members are to be selected. The format of these control statements is as follows:

Columns	1through 4	-	The constant (INDD)
Column	5	-	An equal sign (=)
Columns	6 through *a*	-	The name of a made-up DDNAME
Column	*a*+1	-	An equal sign (=) with no spaces before or after it
Columns	*b* through *c*	-	One of the following words: 1. ALL 2. MEMBER 3. PREFIX

The remaining two fields are required if PREFIX is used as the last operand. Otherwise, they may not be used.

Columns	c+1	-	An equal sign (=) with no spaces before it or after it
Columns	d - *e*	-	A 1 to 7 character prefix which will be used to limit selection

An illustration of the possible combinations follows:

1. INDD=ddname=ALL
2. INDD=ddname=MEMBER
3. INDD=ddname=PREFIX=prefix

An example showing the use of these control statements follows:

```
//STEP1       EXEC   DCDJCL
//MBR.CTLCDMBR      DD  *
INDD=USERDD=PREFIX=SP
//MBR.USERDD          DD   DSN=USER.JCL.LIBRARY,DISP=SHR
```

The above example will pull off all members from the library, specified by the DD name USERDD, which begins with the prefix SP and passes them out to a sequential data set.

It is left up to the user to ensure that all members beginning with the prefix used are definitely JCL members and not something else, (e.g., COBOL programs, COPY members, Assembler programs).

If members are wanted from more than one library, then multiple DDNAMEs may be used. An example follows:

```
//STEP2     EXEC    DCDJCL
//MBR.CTLCDMBR    DD    *
INDD=USERDD=ALL
INDD=OTHERDD=ALL
//MBR.USERDD        DD   DSN=USER.JCL.LIBRARY, DISP=SHR
//MBR.OTHERDD       DD   DSN=USER.JCL.LIBRARY2, DISP=SHR
```

The use of the following words for selection is described here:

1. **ALL**
2. **MEMBER**
3. **PREFIX**

1. **ALL** indicates that all members will be selected from the partitioned data set.

2. **MEMBER** indicates that the user wants to make further selection with member name control cards. These control statements immediately follow the control statement which contains the word MEMBER. An example follows:

```
/STEP3      EXEC     DCDJCL
//MBR.CTLCDMBR    DD   *
INDD=USERDD=MEMBER
MEMBER1
MEMBER2
MEMB03
MEMBER04
//MBR.USERDD        DD   DSN=USER.PDS,DISP=SHR
```

3. **PREFIX** indicates that selection is to be done strictly on the basis of a 1 to 7 character prefix that follows the **(=)** sign after the word PREFIX. An example follows:

```
//STEP4     EXEC     DCDJCL
//MBR.CTLCDMBR    DD   *
INDD=USERDD=PREFIX=TRR
//MBR.USERDD        DD   DSN=USER.JCL.PROC.LIBRARY,DISP=SHR
```

Further notes on the member fetcher:

1. Compressing the PDS before using the data set will eliminate the possibility of pulling in older unwanted members from the PDS.

2. Multiple control statements may be used for any of the above formats.

3. To prevent obtaining duplicate members, do not mix formats in the same run.

Use of Control Statements for Excluding DDNAMEs

When using the DCDJCL PROC to produce a report on a PROC or other JCL which contains DD statements, it is possible to exclude DDNAMEs from the report that do not necessarily add to the value of the report. In some cases, just add paper and distract from the value of the report, (e.g., DDNAMEs like SYSOUT, SYSPRINT and SORTLIB).

To invoke this feature, add a DDNAME with the name of EXCLUDE at the end of the JCL and add the DDNAMEs that are to be excluded as shown in the example below:

```
//STEP1      EXEC   DCDJCL,RPTYPE=JCL
//MBR.CTLCDMBR DD *
INDD=JCLDD=ALL
//MBR.JCLDD            DD   DSN=USER.JCLPROC.LIBRARY,DISP=SHR
//JCLRPT.EXCLUDE       DD   *
SYSUDUMP
SYSOUT
SYSPRINT
SORTLIB
JOBCAT
STEPCAT
/ *
```

JCL Examples

The following example is provided for producing the JCL PROC Analysis Reports:

Example 1

```
//STEP1     EXEC    DCDJCL,RPTYPE=DDN
//MBR.CTLCDMBR  DD  *
INDD=USERDD=MEMBER
JCLPROC1
PROC2
JCLPROC3
PROC4
//MBR.USERDD       DD  DSN=USER.JCL.LIBRARY,DISP=SHR
/ *
```

The above example produces the JCL PROC Analysis Report in DDNAME sequence for the four PROCs listed above.

Example 2

```
//STEP2     EXEC    DCDJCL,RPTYPE=JCL
//MBR.CTLCDMBR  DD  *
INDD=ALPHA=PREFIX=TR
INDD=ALPHA=PREFIX=PR
//MBR.ALPHA         DD  DSN=USER.JCL2.LIBRARY,DISP=SHR
//JCLRPT.EXCLUDE DD   *
SYSOUT
SYSPRINT
/ *
```

The above example produces the JCL PROC Analysis Report in both DDNAME and DSNAME sequence for all PROCs that begin with the prefix TR or PR on the library USER.JCL2.LIBRARY. It will omit the DDNAMEs, SYSOUT and SYSPRINT from that report.

DCDJCL PROC

The following is a listing of the DCDJCL PROC:

```
//DCDJCL   PROC      BUF=5,                  ALLOW 5 BUFFERS FOR MVS
//                   LINECNT=60,             NBR OF LINES PER PAGE
//                   OTHER=,
//                   PRINT='*',
//                   REG=2048K,
//                   RPTYPE=JCL,             (JCL) GIVES THE REPORT IN THREE SEQUENCES
//                   SORTREG=600000,
//                   WORK=SYSDA
//*
//*      MARBLE COMPUTER, INC.               DCDJCL PROC FOR PROC ANALYSIS REPORTS
//*                                                                  REL 4.0        LM090112
 //MBR EXEC     PGM=MBRFETCH,REGION=512K
//*
//*      INSERT          STEPLIB IF NECESSARY
//*
//SYSPRINT      DD   SYSOUT=&PRINT
//WORKFILE      DD   UNIT=&WORK,SPACE=(TRK,(4,2))
//OUTSET        DD   DSN=&&PASSFILE,DISP=(,PASS),UNIT=&WORK,
//        SPACE=(CYL,(5,10))
//*
//JCLRPT    EXEC      PGM=DCDJCL,REGION=&REG,COND=(4,LT,MBR),
//        PARM=('LNC=&LINECNT','SOR=&SORTREG',&RPTYPE,,&OTHER)
//*
//*      INSERT STEPLIB IF NECESSARY
//*
//PRINT           DD   SYSOUT=&PRINT,DCB=BLKSIZE=133
//PRTMSG          DD   SYSOUT=&PRINT,DCB=BLKSIZE=133
//RPTFILE         DD   SYSOUT=&PRINT,DCB=BLKSIZE=133
//SYSOUT          DD   SYSOUT=&PRINT,DCB=BLKSIZE=121
//SYSUDUMP    DD   SYSOUT=&PRINT,DCB=BLKSIZE=133
//SORTMESS    DD   DUMMY,DCB=BLKSIZE=121
//SORTLIB         DD   DSN=SYS1.SORTLIB,DISP=SHR
//SORTWK01    DD   UNIT=&WORK,SPACE=(TRK,(400),,CONTIG)
//SORTWK02    DD   UNIT=&WORK,SPACE=(TRK,(400),,CONTIG)
//SORTWK03    DD   UNIT=&WORK,SPACE=(TRK,(400),,CONTIG)
//PROCFILE        DD   DSN=&&PASSFILE,DISP=(OLD,DELETE),DCB=BUFNO=&BUF
//WKFILE          DD   DISP=(,DELETE),UNIT=&WORK,SPACE=(3240,(200,120)),
//              DCB=(LRECL=108,BLKSIZE=3240,RECFM=FB,BUFNO=&BUF)
//SYSIN           DD   DDNAME=EXCLUDE
//*
//CONTROL       DD   DSN=USER.PDS(DCDCNTRL),DISP=SHR
```

Sample Reports

DATA SET ANALYSIS ** 01/01/2001 ********** PAGE 1

DSNAME	PROGRAM*	PROC**	STEP-NBR	STEP-NAME	DDNAME**	DISPOSITION
	DCDJCL	DCDJCL	2	DCDRPT	WKFILE	NEW DELETE
&&COMPLIST	DCDMAIN	COMACL	1	DCD	INFILE	OLD PASS
	GIVEBACK	COMACL	2	RETCMPLR	INFILE	OLD DELETE
&&PASSFILE	DCDJCL	DCDJCL	2	JCLRPT	PROFILE	OLD DELETE
	MBRFETCH	DCDJCL	1	MBR	OUTSET	MOD PASS
&&TEMP	DCDMAIN	LIBACL	2	DCD	COBOLIN	OLD DELETE
		PANACL	2	DCD	COBOLIN	OLD DELETE
	LIBRARAN	LIBACL	1	LIB	OSJOB	NEW PASS
	PAN#1	PANACL	1	PAN	PAN002	NEW PASS
DDNAME	DCDJCL	DCDJCL	2	JCLRPT	SYSIN	
DUMMY	DCDJCL	DCDJCL	2	JCLRPT	SORTMESS	
LIBRARAN.SOURCE	LIBRARAN	LIBACL	1	LIB	MASTER	SHR
PANVALET.SOURCE	PAN#1	PANACL	1	PAN	PAN001	SHR
SYSOUT	DCDJCL	DCDJCL	2	JCLRPT	PRINT	
			2	JCLRPT	PRTMSG	
			2	JCLRPT	RPTFILE	
			2	JCLRPT	SYSOUT	
			2	JCLRPT	SYSUDUMP	
	DCDMAIN	COMACL	1	DCD	PRINT	
			1	DCD	PRTCMPLR	
			1	DCD	SORTMESS	
			1	DCD	SYSOUT	
			2	DCD	SYSOUT	
		DCDACL	1	DCD	PRINT	
			1	DCD	SORTMESS	
			1	DCD	SYSOUT	
		DCDCOBOL	1	DCD	SYSOUT	
		LIBACL	2	DCD	PRINT	
			2	DCD	SORTMESS	
			2	DCD	SYSOUT	
			2	DCD	SYSOUT	
		PANACL	2	DCD	PRINT	
			2	DCD	SORTMESS	
			2	DCD	SYSOUT	

JCL PROC Analysis Report - DSN Sequence

DATA SET ANALYSIS *** *01/01/2001********** *******PAGE 1

DDNAME*	PROGRAM	PROC ****	STEP-NBR	STEP-NAME	DSNAME**********	DISPOSITION
COBOLIN	DCDMAIN	LIBACL	2	DCD	&&TEMP	OLD DELETE
		PANACL	2	DCD	&&TEMP	OLD DELETE
CONTROL	DCDJCL	DCDJCL	2	JCLRPT	USER.PDS(DCDCNTRL)	SHR
		PANACL	2	JCLRPT	USER.PDS(DCDCNTRL)	SHR
	DCDMAIN	COMACL	1	DCD	USER.PDS(DCDCNTRL)	SHR
		DCDACL	1	DCD	USER.PDS(DCDCNTRL)	SHR
		LIBACL	2	DCD	USER.PDS(DCDCNTRL)	SHR
		PANACL	2	DCD	USER.PDS(DCDCNTRL)	SHR
	DCDSYSTM	DCDCOBOL	1	DCD	USER.PDS(DCDCNTRL)	SHR
INFILE	DCDMAIN	COMACL	1	DCD	&&COMPLIST	OLD PASS
	GIVEBACK	COMACL	2	RETCMPLR	&&COMPLIST	OLD DELETE
LIST	LIBRARAN	LIBACL	1	LIB	SYSOUT	
MASTER	LIBRARAN	LIBACL	1	LIB	LIBRARAN.SOURCE	SHR
OSJOB	LIBRARAN	LIBACL	1	LIB	&&TEMP	NEW PASS
OUTSET	MBRFETCH	DCDJCL	1	MBR	&&PASSFILE	MOD PASS
PAN001	PAN#1	PANACL	1	PAN	PANVALET.SOURCE	SHR
PAN002	PAN#1	PANACL	1	PAN	&&TEMP	NEW PASS
PRINT	DCDJCL	DCDJCL	2	JCLRPT	SYSOUT	
	DCDMAIN	COMACL	1	DCD	SYSOUT	
		DCDACL	1	DCD	SYSOUT	
		LIBACL	2	DCD	SYSOUT	
		PANACL	2	DCD	SYSOUT	
	DCDSYSTM	DCDCOBOL	1	DCD	SYSOUT	
PROFILE	DCDJCL	DCDJCL	2	JCLRPT	&&PASSFILE	OLD DELETE
PRTCMPLR	DCDMAIN	COMACL	1	DCD	SYSOUT	
PRTFILE	GIVEBACK	COMACL	2	RETCMPLR	SYSOUT	
PRTMSG	DCDJCL	DCDJCL	2	JCLRPT	SYSOUT	
REPORTS	DCDSYSTM	DCDCOBOL	1	DCD	SYSOUT	

JCL PROC Analysis Report - DDNAME Sequence

JCL DATA SET ANALYSIS 01/01/2001 INPUT SEQUENCE (NO SORTING) PAGE 1

DDNAME**	PROGRAM*	PROC****	STEP-NBR	STEP-NAME	DSNAME**********	DISPOSITION
CONTROL	DCDMAIN	DCDACL	1	DCD	USER.PDS(DCDCNTRL)	SHR
PRINT			1		SYSOUT	
SORTLIB			1		SYS1.SORTLIB	SHR
SORTMESS			1		SYSOUT	
SYSOUT			1		SYOUT	
SYSPRINT	LIBRARAN	LIBACL	1	LIB	SYSOUT	
LIST			1		SYSOUT	
MASTER			1		LIBRARAN.SOURCE	SHR
OSJOB			1		&&TEMP	NEW PASS
COBOLIN	DCDMAIN		2	DCD	&& TEMP	OLD DELETE
CONTROL			2		USERPDS(DCDCNTRL)	SHR
PRINT			2		SYSOUT	
SORTLIB			2		SYS1.SORTLIB	SHR
SORTMESS			2		SYSOUT	
SYSOUT			2		SYSOUT	
SYSPRINT	MBRFETCH	DCDJCL	1	MBR	SYSOUT	
OUTSET			1		&&PASSFILE	MOD PASS
PRINT	DCDJCL		2	JCLRPT	SYSOUT	
PRTMSG			2		SYSOUT	
RPTFILE			2		SYSOUT	
SYSOUT			2		SYSOUT	
SYSUDUMP			2		SYSOUT	
SYSOUT			2		SYSOUT	
SORTMESS			2		DUMMY	
SORTLIB			2		SYS1.SORTLIB	SHR
PROCFILE			2		&&PASSFILE	OLD DELETE
WKFILE			2			NEW DELETE
SYSIN			2		DDNAME=EXCLUDE	
CONTROL			2		USER.PDS(DCDCNTRL)	SHR

JCL PROC Analysis Report - Unsorted Sequence

JCL JOBLIB ANALYSIS 01/01/2001 IN JOB NAME SEQUENCE PAGE 1

JOBNAME	PROCNAME
DCD115D	>----------<
	COPYPROC
	DVN2PROC
	PROC003
DCD116D	>----------<
	DTNUPR2
DCD116NA	>----------<
	DTNPRC60
	DTNUPR2
DCD117D	>----------<
	DSN1PR1
	DSN2PR1
	DSN3PR6
	DSN4PR6
	PROC01
	PROC02
	TRAC03NA
DCD118L	>----------<
	TRUN02A
	TRUN03
	YTOKENS

Job Library Report - JOB NAME Sequence

Release 4.0

DCD IV

Error Messages

Notice – Error Messages have been **completely changed** in Release 3.6 of DCD III

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Error Messages

Each error message has a 10-character alphanumeric code associated with it in the following format:

Positions 1 - 3 - DCD
Position 4 - character indicating the sub-system the message comes from
Position 5 - character indicating a program within specified sub-system
Position 6 - 8 - 3 characters indicating the location within the program of the message
Position 9 - hyphen (-)
Position 10 - one of the following letters: I, W, C, E, or D where:

I indicates an informational message that requires no action from the user.

W indicates a warning, which the user should look at, then correct if necessary.

C indicates an error was found and it should be looked at and if possible, corrected.

E indicates an error was found and it should be looked at and corrected.

D indicates an error was found that is causing DCD IV to stop processing prior to normal end of job. This error must be corrected before DCD IV will successfully run.

Error messages when they are present will print on the PRINT DD file starting on the second or third page.

If the PRINT DD is somehow omitted, then the following messages will occur on the SYSOUT file:

***** DDNAME (PRINT) MISSING
***** DDNAME (PRINT) MISSING

DCD IV messages are listed on the following pages in alphanumeric sequence of the 10-character codes associated with each error message, with numbers sorting ahead of letters.

If you should encounter error messages in your DCD IV run that are not self explanatory or require further explanation, look the message up and follow any comments that are given for that particular error message.

The Error messages listed below are major errors that are not listed on the following pages, and are unlikely to occur. Should you receive one of these errors, we request that you contact Marble Computer, Inc. for further assistance, should re-running or correcting any JCL errors not immediately correct the problem or remove the error.

DCDA4022-D	DCDGJH07-E	DCDKBY40-D	DCDMGM86-E	DCDNHA13-E
DCDCC005-E	DCDGJH17-E	DCDKBY50-D	DCDMGM95-E	DCDNHB12-E
DCDCCC02-E	DCDGKA02-D	DCDKM020-D	DCDMHC02-D	DCDNHK01-D
DCDCCG03-E	DCDGKC01-E	DCDKW040-D	DCDMHM85-E	DCDNL004-D
DCDEA030-D	DCDGKD01-E	DCDM3030-D	DCDMHM86-E	DCDPB050-D
DCDEAC04–E	DCDGP040-D	DCDM5050-D	DCDMHM95-E	DCDPEY70-D
DCDEAE01-E	DCDGQA02-D	DCDM5A02-D	DCDMKB02-D	DCDPEY80-D
DCDEB030-D	DCDGR020-D	DCDM5B12-E	DCDMNA02-D	DCDPNU20-D
DCDEFB91-E	DCDGS010-D	DCDM7A02-D	DCDMP030-D	DCDPNU21-D
DCDEFH00-E	DCDGS030-D	DCDM7B04-D	DCDMQA02-D	DCDTBM85-E
DCDEFH21-E	DCDGSE04-E	DCDM7C02-D	DCDMQB10-E	DCDTBM86-E
DCDESDDA-D	DCDGSFA1-E	DCDM7F02-D	DCDMRA02-D	DCDTBM95-E
DCDESDDE-D	DCDGSG01-E	DCDM8A02-D	DCDMRB10-E	DCDTDM85-E
DCDESDDK-E	DCDGSG09-E	DCDM8B13-D	DCDMWBA1-E	DCDTDM86-E
DCDESYLB-E	DCDGSGA1-D	DCDM8C02-D	DCDMWC20-E	DCDTDM95-E
DCDG8030-D	DCDGV040-D	DCDM8D13-D	DCDMWCB0-E	DCDTJ040-D
DCDGBA02-D	DCDJAA02-D	DCDM8M01-D	DCDMWD20-E	DCDTLC02-D
DCDGBA10-E	DCDJAA06-D	DCDM8M02-D	DCDMWDB1-E	DCDTLM85-E
DCDGBB03-D	DCDJCA02-D	DCDM8Q01-E	DCDMWDD2-E	DCDTLM86-E
DCDGBB11-E	DCDJCA06-D	DCDMBC02-D	DCDMWFA1-E	DCDTLM95-E
DCDGBB20-E	DCDJE050-D	DCDMBM85-E	DCDMWGA3-E	DCDUDA01-D
DCDGBB50-E	DCDJEA01-D	DCDMBM86-E	DCDMX020-D	DCDUF010-D
DCDGBC01-D	DCDJEB10-E	DCDMBM95-E	DCDMX030-D	DCDUFA02-D
DCDGE030-D	DCDJGA02-D	DCDMCA02-D	DCDMX040-D	DCDUFD01-E
DCDGF030-D	DCDJIA02-D	DCDMCB09-D	DCDMX050-D	DCDUHD01-E
DCDGF060-D	DCDJPA02-D	DCDMCC02-D	DCDNB020-D	DCDUJA02-E
DCDGJA02-D	DCDJPW03-D	DCDMCF02-D	DCDNB060-D	DCDV3055-D
DCDGJC01-E	DCDJPAA1-D	DCDME030-D	DCDND040-D	DCDVA021-D
DCDGJD01-E	DCDKBR10-E	DCDMGC02-D	DCDNF020-D	DCDVAW03-D
DCDGJF02-D	DCDKBR30-E	DCDMGM85-E	DCDNH050-D	

If you need to contact Marble Computer, Inc. for technical support, you may follow one of the below suggested procedures:

1. Send an email to us at support@marblecomputer.com with any attachments needed.

2. You may call Marble Computer, Inc. toll-free at 800-252-1400. We recommend having the following information available when calling.
   - Release number and release date of the version of DCD IV that you are running
   - The error message number(s)
   - If you are using DCD IV as a remote job entry to a data center, specify the location of the data center that you are using.
   - Exactly what conditions existed when the error messages were encountered (what PARM options were in effect, what PROC was being executed, any other related conditions).

DCD5E040-C **PARM LENGTH GREATER THAN 100 - ACCEPTED**
Explanation: The number of characters in the total PARM field is greater than 100 characters. Only the first 100 characters are meaningful to DCD IV. The characters over 100 are ignored.
User Action: Make adjustments to the PARM field to reduce the total length to be under 100 characters.

DCD5E052-I **PARM (R3N) OPTION TURNS OFF (PMO) OPTION ELIMINATING PRINTING OF OFFSETS TO THE FAR RIGHT OF SOURCE CODE**
Explanation: Parm option R3N is inconsistent with parm option PMO. Option R3N carries PL and SL information from the right hand side of the compile listing into right side of DCD IV listing, while option PMO traps information from the compile OFFSET option and prints into right side of DCD IV listing.
User Action: Determine whether PMO option is needed, and if not needed turn that options off, or turn option R3N off.

DCD5E056-W **PARM OPTION (NIS) MAY NOT BE USED WITH OPTION (IREFS) - OPTION (IREFS) IS TURNED OFF**
Explanation: Parm option NIS (which is used to provide a sequential sequence) for Procedure Division Narrative is not compatible with the IREFS option which provides indirect References.
The IREFS option is being turned off. To turn it back on, do not use PARM option NIS.
User Action: Determine whether NIS option is needed, and if not, turn that options off.

DCD5E060-D **PARM OPTION (LOR) MAY NOT BE USED WHEN OTHER REPORTS ARE ALSO TURNED ON**
Explanation: The option LOR indicates that non-COBOL programs are being used as input for creating the Layouts Reports.
User Action: Do not use this option when other report options are also turned on.

DCD5E061-W **PARM OPTION (LHR) TREATED AS (LHX) WHEN OPTION (LNR) FOR NARRATIVE IS IN EFFECT**
Explanation: Options LHR and LNR are incompatible. See these options in this User's Manual.
User Action: Do not use these options together.

DCD5E062-D **PARM OPTION (TRACE) NOT ALLOWED WHEN OPTIONS (WRITPDS OR READPDS) ARE USED**
Explanation: Option TRACE is incompatible with option WRITPDS or READPDS. See these options in this User's Manual.
User Action: Do not use these options together. Eliminate TRACE or eliminate READPDS or WRITPDS.

DCD5E063-D **AT LEAST ONE PRINT REPORT OPTION MUST BE TURNED ON WHEN RUNNING THE OTHER COBOL REPORTS**
Explanation: No PARM options were specified (DATA, LAYOUT, etc...) for printing of reports or for the specification of the Data Dictionary file. Even when using WRITPDS or READPDS options, report options must be specified.
User Action: Specify one or more report options.

DCD5E065-D **(WRITPDS) PARM OPTION ALSO REQUIRES (BEGIN) OR (CONTINUE) PARM OPTION**
Explanation: Parm option WRITPDS requires either option BEG or CON. See these options in this User's Manual.
User Action: Add parm option BEGIN or parm option CONTINUE.

DCD5E067-D **PARM OPTION (S03), (S15) OR (S50) MAY NOT BE USED WITH (LAYOUT) OR (RECORDS) OPTION**
Explanation: PARM options S013, S15, S50, S3H and S1T alter the maximum size of OCCURS within a record which contains an OCCUR clause for use with the System Record Analysis Report. Using these options with the RECORD or LAYOUT reports will produce incorrect results.
User Action: Turn off the RECORD and LAYOUT options or remove the S03, S15, S50, S3H and S1T options being used.

DCD5E800-I **(STOP) PARM OPTION IN EFFECT**
Explanation: The PARM option STOP was entered and processing in DCD IV is halted.
User Action: None. To process with DCD IV, remove the STOP option.

DCD5EA11-E **PARM OPTION (parm field) INVALID WHEN FOLLOWING (option) AND IS IGNORED**
Explanation: The two PARM fields shown in the message conflict with each other. The first PARM option will be used and the second one will be ignored.
User Action: Remove either of the two options shown.

DCD5EA20-C **INTERNAL ERROR FOR PARM (parm field)**
Explanation: An internal error has occurred during the storing of PARM fields.

User Action: Save printed output and contact MARBLE Computer, Inc.

DCD5EA50-D FIELD IN PARM RECORD TOO LARGE (parm field)
Explanation: The PARM field displayed is in excess of 10 characters. All valid PARM fields are 10 characters or under in length.
User Action: Determine what PARM field was intended and correct.

DCD5EA70-D PARM-FIELD IS INVALID (parm field)
Explanation: The first three characters of the PARM field displayed do not match to a valid PARM field.
User Action: Consult the User's Manual if necessary and then re-enter a valid PARM field.

DCD5EA78-C FOUND MORE THAN 1 PARM OPTION IN THE RANGE IR1 - IR6 –USING LAST FOUND
Explanation: More than one parm option (IR1, IR2, IR3, IR4, IR5, IR6) was used.
User Action: Remove one or more parm options, so that only one is present.

DCD5EA90-W PARM OPTION (parm field) MISCODED. ACCEPTED AS (parm field)
Explanation: The first three characters of the PARM field matches with a valid PARM option, however, the remaining characters do not match.
User Action: Check to be sure the PARM option used was the one intended. Correct the PARM field for later runs.

DCD5EC01-E PARM OPTION (parm field) NOT FOLLOWED BY (=) AND (VALUE)
Explanation: The PARM field displayed is a keyword type option which requires both an (=) sign and value after the (=) character. Either the (=) character is missing or the value after the (=) character is miscoded or missing.
User Action: Ensure that the fully coded PARM field contains the (=) character and a valid value. It may also help to ensure that the entire keyword and value are enclosed in single apostrophes.

DCD5EF01-C PROBLEM WITH CLN= (USING CLN=60)
Explanation: The value found after CLN= was not numeric or was numerically greater than 999.
User Action: Correct by using a valid number. For this run a default of 60 is used.

DCD5EF02-C PROBLEM WITH LNC= (USING LNC=60)
Explanation: The value found after LNC= was not numeric or was numerically greater than 999.
User Action: Correct by using a valid number. For this run a default of 60 is used.

DCD5EF03-C PROBLEM WITH SOR= (USING SOR=150000)
Explanation: The value found after SOR= was not numeric or was 10 million or greater.
User Action: Use a valid number for SORT region. Make sure the overall REGION is 3072 to 4096K- larger than the SORT region.

DCD5EF25-C PROBLEM WITH TAC= (USING TAC=025)
Explanation: The value found after TAC = was not numeric or was numerically greater than 999.
User Action: Correct by using a valid number. For this run, default of 025 is used.

DCD5G010-D DDNAME (CONTROL) MISSING
Explanation: A DD card is missing from the user JCL.
User Action: See the User's Manual and Installation Addendum for instructions on adding a CONTROL DD card.

DCD5G025-D //CONTROL DD CONTROL INFO MISSING
Explanation: The CONTROL DD file is empty. One control record is required.
User Action: See the Installation Addendum for format and provide the control record required.

DCD5G030-D //CONTROL DD CONTROL INFO . MUST BE IN VALID FORMAT (MMYY). FOUND (xxxx)
Explanation: The password control information contains invalid information in columns 1-4. MMYY for month and year is expected.
User Action: Enter the information in correct format (MMYY) and run again. If necessary consult the Installation Addendum for further information.

DCD5G046-D CONTROL MONTH/YEAR EXPIRED - MM/YYYY = XX/XXXX
Explanation: Six characters of control information matching to MMYYYY are invalid.
User Action: See the Installation Addendum or contact MARBLE Computer, Inc.

DCD5G048-D SIX CHARACTER CODE (6-char) IN //CONTROL DD CONTROL INFO IS INVALID.
Explanation: Six characters of control information are invalid.
User Action: See the Installation Addendum or contact MARBLE Computer, Inc.

DCD5H050-E **(TRACEIN) COMMANDS MUST BEGIN WITH AN (AFTER) COMMAND**
Explanation: When using the debugging control statements under direction of Marble Computer, each command must begin with the word (AFTER)
User Action: Check the TRACEIN DD statements and make corrections to the TRACEIN commands as necessary.

DCD5H070-D **ONE OR MORE ERRORS FOUND IN (TRACEIN) COMMANDS**
Explanation: One or more errors occurred in processing the debugging control statements.
User Action: Check the related error messages and make corrections to the TRACEIN commands as necessary.

DCD5HA01-E **PROGRAM-NAME MISSING AFTER (AFTER) COMMAND IN (TRACEIN) FILE**
Explanation: The program name must be used in the TRACEIN file. It was not there.
User Action: Check the TRACEIN file and make corrections as necessary.

DCD5HA02-E **EXPECTING WORD (PRINT) WITHIN (TRACEIN) FILE FOUND (field-contents)**
Explanation: The word PRINT must be used in the TRACEIN file. It could not be found.
User Action: Check the TRACEIN file and make corrections as necessary.

DCD5HA03-E **EXPECTING (DCDWK01) THRU (DCDWK06) WITHIN (TRACEIN) FILE - FOUND (field-contents)**
Explanation: The file names to be TRACEed must be DCDWK01 through DCDWK06.
User Action: Check the file names and correct as necessary.

DCD5HA05-E **ONLY 10 CONTROL CARDS ALLOWED WITHIN (TRACEIN) FILE**
Explanation: The number of control cards in the TRACEIN file exceeds 10.
User Action: Check the TRACEIN file and delete excess cards so there are a total of 10 cards or less.

DCD5HA06-E **EXPECTING NEW (AFTER) COMMAND**
Explanation: The end of one command in the TRACEIN file was found. The next token (if present) must be the start of a new command.
User Action: If multiple commands are used, make sure each new command starts with the word AFTER.

DCD5HA31-E **DCDWKXX NUMBER MUST BE 01 TO 06 WITHIN (TRACEIN) FILE**
Explanation: The DCDWKXX file that has been specified in the TRACEIN file does not exist.
User Action: Check the file names and make corrections as necessary.

DCD5HA35-E **PROGRAM OR FILE NUMBER IN CONTROL CARD IS INVALID**
Explanation: The program-id did not match or the record length was not numeric.
User Action: Check the control card and make corrections as necessary.

DCD5HA90-I **BYPASSING TOKENS WITHIN (TRACEIN) FILE UNTIL NEXT (AFTER) OR END OF FILE**
Explanation: A previous documented syntax error was found while scanning an AFTER command within the TRACEIN file. Further scanning for errors will not be done until a new AFTER command is found.
User Action: None.

DCD5X001-C **EXCESSIVE ERROR MESSAGES IN HSKPG**
Explanation: The table of error messages was exceeded for the first phase of processing within DCD IV.
User Action: Examine the previous error messages and make corrections as necessary to eliminate the errors.

DCD63070-E **THE VALUES USED WITHIN SELECT CARDS ESTABLISHES A RANGE THAT IS NEGATIVE**
Explanation: Control cards used to select records for Layout Reports by record size are incorrect.
User Action: Correct either the SELECT> or the SELECT< card.

DCD63080-I **USING CONTROL CARDS FOR SELECTION BY DATA-NAME FOR LAYOUTS**
Explanation: This is an informational message reminding the user that control cards are being used for the selection of Layout Reports.
User Action: None.

DCD63081-I **USING CONTROL CARDS FOR SELECTION BY RECORD-SIZE FOR LAYOUTS**
Explanation: This is an informational message reminding the user that control cards are being used for the selection of Layout Reports.
User Action: None.

DCD63A03-I **DATA NAME IS GREATER THAN 30 CHARACTERS**
Explanation: Programmer-supplied names must be 30 characters or less in length.
User Action: Check the data name to make sure that it less than 30 characters.

DCD63A06-E **UNIDENTIFIED FIELD AFTER DATA NAME (record-name)**
Explanation: Field in control statement after data name indicated is in error.
User Action: Check the control statement, correct, and re-submit.

DCD63A07-E **ONLY 750 CONTROL CARDS ALLOWED WITHIN FILE**
Explanation: There are two many control statements used.
User Action: Check the file and eliminate excess cards so there are a total of 750 statements or less.

DCD63AA1-E **CONFLICTS WITH A PREVIOUS (SELECT) CONTROL CARD**
Explanation: The control card conflicts with a previous SELECT control card.
User Action: Check the control cards and make necessary changes.

DCD63AA2-E **CONFLICTS WITH A PREVIOUS (SELECT) CONTROL CARD**
Explanation: The control card conflicts with a previous SELECT control card.
User Action: Check the control cards and make necessary changes.

DCD63AA3-E **SYNTAX ERROR IN SELECT CARD**
Explanation: The SELECT card has a non-numeric field or a number over 6 characters in length.
User Action: The correct format requires positions 1-6 to be numeric, columns 7 to be a dash, and 8-13 to be numeric.

DCD66003-D **DDNAME (CTLCDSRA) IS MISSING**
Explanation: In the JCL, the DD card for CTLCDSRA is missing.
User Action: Check JCL to ensure the DD card for CTLCDSRA is there and correctly placed. This control card is needed when PARM option DICT or SRA is used.

DCD66A03-E **PROGRAM-ID IN EXCESS OF 8 CHARACTERS**
Explanation: The program name/record name control card statement is invalid.
User Action: A 1 - 8 character program name must begin in column 1.

DCD66A04-E **RECORD NAME OR LENGTH IN A CONTROL CARD IS MISSING**
Explanation: The control card is missing either the record name or length.
User Action: Check the control card for the record name or length to ensure one is present.

DCD66A05-E **RECORD NAME IN EXCESS OF 30 CHARACTERS**
Explanation: The program name/record name control card statement is invalid.
User Action: A 1 - 8 character program name must begin in column 1. A 1 - 30 character 01 record name must follow after one or more spaces.

DCD66A06-E **NUMERIC FIELD IS IN EXCESS OF 6 CHARACTERS**
Explanation: A control card field used for the System Record Analysis Report has a numeric field greater than 6 digits in length.
User Action: Shorten the number to 6 digits.

DCD66A07-E **MAXIMUM NUMBER OF CONTROL CARDS WITHIN A FILE HAS BEEN EXCEEDED**
Explanation: The number of control cards in the file has been exceeded.
User Action: Check the file and delete excess cards.

DCD66AB2-E **A FIELD IS IN EXCESS OF 6 CHARACTERS OR NOT NUMERIC**
Explanation: A numeric field within an SRA control statement range is too big or not numeric.
User Action: Correct the control statement and rerun.

DCD66AB3-E **THE RANGE OF NUMBERS IN SRA CTL CD IS INVALID**
Explanation: A range of numbers found in an SRA control statement was found to be invalid.
User Action: Determine what should be entered, fix, and rerun.

DCD6AB01-D **POSITIONS 33 THROUGH 72 IN CONTROL CARD MUST BE BLANK**
Explanation: Control Statements for option DIT must have positions 33 up through position 72 blank.
User Action: Look at control statements used, consult manual if need be, and correct.

DCD6AC01-D **LEADING SPACES ARE NOT PERMITTED FOR THESE CONTROL STATEMENTS**
Explanation: Control Statements for option DIT must have the command used start in column 1.
User Action: Look at control statements used and correct.

DCD6AD10-D **DDNAME (CTLCDDLT) IS MISSING WHEN PARM OPTION (DIT) IS SPECIFIED**
Explanation: Option DIT was used indicating control statements for Literal Tracing, however the required DDNAME CTLCDDLT is missing.

User Action: Remove option DIT, or add DDNAME CTLCDDLT with valid control statements.

DCD6AD20-D **DDNAME (DCDWKT1) IS MISSING WHEN PARM OPTION (DIT) IS SPECIFIED**
Explanation: Option DIT requires an extra work file DCDWKT1 and this file was not found.
User Action: Add an extra work file, similar to work file DCDWK01, 02, etc. with the name DCDWKT1. Also insure that DD names DCDWKT2, DCDWKT3, and DCDWKT4 are added similar to DCDWKT1.

DCD6C030-D **DDNAME (SELECT) IS MISSING WHEN PARM OPTION (TRACE) IS SPECIFIED**
Explanation: Parm Option TRACE indicates SELECTs are used for 'Follow a Data Field' report and DD SELECT is required.
User Action: Inspect JCL and add DDNAME **SELECT** with SELECTs to produce report.

DCD6C031-D **DDNAME (DCDWK08) MISSING**
Explanation: A DDNAME (DCDWK08) is missing from JCL.
User Action: Inspect JCL and add DDNAME DCDWK08 to same.

DCD6C110-D **CORRECT ERRORS FOUND IN SELECT STATEMENTS - SEE REPORT FILE**
Explanation: See other file and look at syntax errors there for SELECT control statements used.
User Action: Correct the errors found and resubmit the run.

DCD6CF02-D **A LIMIT OF 250 SELECT STATEMENTS ARE ALLOWED FOR (TRACE) - THIS NUMBER WAS EXCEEDED**
Explanation: More than 250 SELECTs were submitted. The limit allowed is 250.
User Action: Reduce run to 250 SELECTs or less and resubmit.

DCD6CJ01-D **SELECTS WITHOUT (NAME) KEYWORD MUST COME BEFORE SELECTS WITH (NAME) KEYWORD**
Explanation: Format#2 SELECTs in format **SELECT IF NAME = data-name** must come after all other SELECTs using format#1 which uses other keywords with AND/OR logic.
User Action: Put all SELECT IF NAME control statements last and resubmit.

DCDA2001-D **DDNAME (INFILE) MISSING FOR (COMPILE) MODE - IF INDEPENDENT MODE, DO NOT USE (COM) OPTION**
Explanation: Parm option COM was found indicating COMPILE mode. For Compile Mode, a DD file INFILE is required to pass the original compile listing into DCD, and this DD name was not found.
User Action: See the discussion in the User's Manual under the heading 'Compile Mode Considerations' under 'Alternate Compile Listing'.

DCDA2002-D **DDNAME (DCDWK01) MISSING**
Explanation: The running of DCD IV requires work files DCDWK01 and more. The DDNAME DCDWK01 was not found..
User Action: See JCL examples in the 'Alternate Compile Listing' section in the User's Manual and correct JCL.

DCDA2003-D **DDNAME (PRTCMPLR) MISSING FOR (COMPILE) MODE - IF INDEPENDENT MODE, DO NOT USE (COM) OPTION**
Explanation: Parm option COM was found indicating COMPILE mode. For Compile Mode, a DD file PRTCMPLR is required to pass back some reports from the original compile listing , and this DD name was not found.
User Action: See JCL examples in the 'Alternate Compile Listing' section in the User's Manual and correct JCL.

DCDA2120-C **DCD Compile LINECNT (CLN=nn) DOES NOT MATCH (LINECNT=nn) FOUND IN (*OPTIONS IN EFFECT) IN COMPILE LISTING**
Explanation: The DCD IV CLN=value (user entered) does not match the line count found within the compile listing.
User Action: Use the CLN=PARM option along with the appropriate value. The error should be corrected by entering a CLN=field with a value equal to that shown within the LINECNT=field of the compile step.

DCDA2200-D **SYSPRINT FILE INTO DCD IS NOT COBOL OR IS INVALID. ENSURE THAT DISP=(MOD, PASS) IS USED ON SYSPRINT DD IN COMPILE STEP AND (NONUM) IS COMPILER OPTION (CHECK USE OF VS2/NOVS2 OPTION)**
Explanation: The INFILE DD within the DD step is not successfully reading in the trapped compiler listing on the SYSPRINT DD from the compile step.
User Action: 1 .Consult "Examples" in the Alternate Compile Listing Facility section for correctly setting up the COB.SYSPRINT DD in the compile step.
a) Ensure that (MOD,PASS) is used as a disposition within the SYSPRINT DD.
b) Ensure that both NONUM and SOURCE are specified as compiler options.
c) Ensure that the compile step ran successfully.
d) Ensure that NOVS2 is being defaulted to when using COBOL 68 or COBOL 74. Ensure that VS2 is used when VS COBOL II (COBOL 85) is used.

2. Consult the COMACL PROC within the User's Manual to ensure the SYSPRINT DD is being used correctly.
3. If Independent Mode was intended, do not use the COM option or the COMACL PROC.

DCDA2P01-D **VS COBOL II LISTING FOUND, VS2 OPTION NOT IN EFFECT, USE PARM OPT ION (VS2) TO CORRECT**
Explanation: PARM Option VS2 is required when VS COBOL II or new COBOL releases are used.
User Action: Use PARM Option VS2 (e.g. OTHER= 'VS')

DCDA4008-D **DDNAME (COBOLIN) MISSING FOR (INDEPENDENT) MODE - IF COMPILE MODE, USE (COM) PARM OPTION**
Explanation: In the JCL, the COBOLIN DD card is missing from the file being compiled.
User Action: If in Independent Mode, check JCL to ensure DD card for COBOLIN is there and correctly placed.
If in Compile Mode, run DCD IV with the COM option. The COBOLIN DD is used for specifying the COBOL program to be run through DCD IV, unless the COM option is used.

DCDA4009-D **DDNAME (DCDWK01) MISSING**
Explanation: In the JCL, the DD card for DCDWK01 is missing.
User Action: Check the JCL to ensure the DD card for DCDWK01 exists and is correctly placed.

DCDA4010-I **ERROR IN PROCESSING BASIS PROGRAMS**
Explanation: Informational message preceding BASIS error messages.
User Action: Examine output following error message to determine cause of problem.

DCDA4011-I **NORMAL END OF BASIS PROCESSING**
Explanation: Informational message following the processing of cards from the BASIS DD file.
User Action: None.

DCDA4040-D **EMPTY FILE FOUND FOR COBOL PROGRAM**
Explanation: COBOL file exists but contains no records
User Action: Check to ensure COBOL file contains records.

DCDA4B00-D **DDNAME (BASIS) MISSING AND IS REQUIRED WHEN PARM OPTION (BASIS) IS USED**
Explanation: In the JCL, the BASIS DD card is missing.
User Action: Check JCL to ensure the BASIS DD card exists and is correctly placed or remove BASIS as a PARM option.

DCDA4B02-D **NO COBOL INPUT FOUND ON DDNAME (COBOLIN)**
Explanation: COBOL file exists (used with BASIS option) but contains no records.
User Action: Check to ensure COBOL file contains records.

DCDA4B03-D **NO BASIS INPUT FOUND ON DDNAME (BASIS)**
Explanation: BASIS DD card was found but no records associated with that DD were found.
User Action: Check to ensure that the BASIS DD cards are present, formatted correctly and follow the BASIS DD.

DCDA4B04-D **FIRST CARD IN THE BASIS DD IS NOT (BASIS)**
Explanation: The first card found where the BASIS card should appear is not a BASIS card.
User Action: Check to ensure the BASIS card is correctly placed.

DCDA4C01-D **BASIS (program name) PROGRAM NOT FOUND ON (COBOLIN) INPUT FILE**
Explanation: The program name given in the BASIS DD card does not match the program found on the COBOLIN file.
User Action: Check the BASIS DD card and ensure the program name is correct and matches the program pointed to by the COBOLIN file.

DCDA4C02-D **CARD FOLLOWING (BASIS) NOT (INSERT) OR (DELETE)**
Explanation: The first card following the BASIS DD card was not an INSERT card or a DELETE card. It must be one of these.
User Action: Check to ensure that the INSERT / DELETE cards following the BASIS DD card are correctly placed and that an INSERT or DELETE card immediately follows the BASIS card.

DCDA4E01-D **INSERT (sequence #) OUT OF SEQUENCE**
Explanation: An INSERT card was found with a sequence number lower than a previous sequence number on an INSERT or DELETE
User Action: Check to ensure the INSERT / DELETE cards are in proper sequence and the sequence numbers are in ascending order.

DCDA4E02-D **INSERT (sequence #) NOT FOUND IN PROGRAM**
Explanation: An INSERT card was found with a sequence number that does not exist in the main program.
User Action: Check INSERT cards and make sure all sequence numbers are valid and match sequence numbers in the main program.

DCDA4E03-D **INSERT (sequence #) - NO INSERTS FOUND**
Explanation: An INSERT was found with no COBOL code following it. One line of code must follow an INSERT card.
User Action: Check INSERT cards to ensure they are properly placed and at least 1 line of COBOL code follows each.

DCDA4F01-D **DELETE (sequence #) OUT OF SEQUENCE**
Explanation: A DELETE card was found with a sequence number lower than a previous sequence number on an INSERT or DELETE card.
User Action: Check to ensure INSERT / DELETE cards are in proper sequence and are in ascending order.

DCDA4G02-D **(DELETE) FIRST NUMBER IN RANGE (sequence #) NOT FOUND**
Explanation: The first sequence number in a DELETE range does not match a valid sequence number in the main program.
User Action: Check to ensure all sequence numbers in DELETE range match valid sequence numbers in the program.

DCDA4G04-D **(DELETE) RANGE (1st sequence #) - (2nd sequence #) NOT FOUND**
Explanation: The sequence numbers found in a DELETE card do not match valid sequence numbers in the main program.
User Action: Check sequence numbers on DELETE cards and ensure they match valid sequence numbers in program.

DCDA4SA0-I **HANDLING BASIS CARD: basis card**
Explanation: An informational message to assure the user that the BASIS card is being processed by DCD IV.
User Action: None.

DCDAS010-D **DDNAME (PCWORK01) MISSING**
Explanation: The DDNAME (PCWORK01) is missing from JCL the PROC currently being used to create the 'Alternate Compile Listing'. See newer JCL DDNAMES required by release 4.0 or later of DCD IV.
User Action: Get newer DDNAMES added to DCD JCL PROCS.

DCDAS012-D **DDNAME (PCWORK02) MISSING**
Explanation: The DDNAME (PCWORK02) is missing from JCL the PROC currently being used to create the 'Alternate Compile Listing'. See newer JCL DDNAMES required by release 4.0 or later of DCD IV.
User Action: Get newer DDNAMES added to DCD JCL PROCS.

DCDAW010-D **DDNAME (PCTEMPFL) MISSING**
Explanation: The DDNAME (PCTEMPFL) is missing from JCL the PROC currently being used to create the 'Alternate Compile Listing'. See newer JCL DDNAMES required by release 4.0 or later of DCD IV.
User Action: Get newer DDNAMES added to DCD JCL PROCS.

DCDB0015-D **DDNAME (COBOLIN) MISSING**
Explanation: In the JCL, the DD card for COBOLIN is missing.
User Action: Check the JCL to ensure DD card for COBOLIN exists and is correctly placed.

DCDB0016-D **DDNAME (DCDWK01) MISSING**
Explanation: In the JCL, the DD card for DCDWK01 is missing.
User Action: Check the JCL to ensure DD card for DCDWK01 exists and is correctly placed.

DCDB0022-D **DCDMULTI (program name) PROGRAM NOT FOUND ON (COBOLIN) INPUT FILE**
Explanation: A logic error has occurred. Program member does not match the COBOLIN file.
User Action: Check the JCL to ensure DD card member exists and is correctly placed.

DCDB0030-D **EMPTY FILE FOUND FOR COBOL PROGRAM**
Explanation: COBOL file exists but contains no records.
User Action: Check to ensure COBOL file contains records.

DCDB0040-E **(TRACE) OPTION available for first program found – Ignored for EXTRA programs**
Explanation: Tracing and Analysis is only available for one program at a time. If more programs were inputted, then the extra programs will not have Tracing and Analysis done on them.
User Action: Limit Tracing and Analysis to one program at a time.

DCDB0041-E **(DIT) OPTION available for first program found – Ignored for EXTRA programs**

Explanation: Direct Tracing of Literals is only available for one program at a time. If more programs were inputted, then the extra programs will not have Direct Tracing of Literals done on them
User Action: Limit Direct Tracing of Literals to one program at a time.

DCDB0C01-W START OF ASSEMBLER PROGRAM FOUND WITHIN PROGRAM
Explanation: The start of an Assembler program was found when reading in COBOL programs.
User Action: Review the input and ensure that only COBOL programs are being inputted.

DCDB0D02-W COLUMN 7 OF LINE AFTER THE PROCEDURE DIVISION OF COBOL PROGRAM (XXXXXXXX) IS INVALID - SEE NEXT LINE
Explanation: Within the Procedure Division, a line was found which may be invalid.
User Action: Examine the line and take corrective action if necessary.

DCDB0F01-D USE OF PARM OPTION (LOR) REQUIRES COBOL RECS - FOUND COBOL PROGRAM INSTEAD
Explanation: A COBOL program was found as input when the PARM option LOR indicated Data Division records were being inputted.
User Action: Review what was intended and correct.

DCDB0XA6-C COBOL PROGRAM (program name) WAS DUPLICATED
Explanation: More than one COBOL program was found with this program name.
User Action: Determine why duplicate programs are present and remove those that are not wanted.

DCDB0XA7-I COBOL PROGRAM-ID (program) BEING PROCESSED - (nnnnn)
Explanation: Informational message produced for every COBOL program.
User Action: None.

DCDB0XA9-W INVALID WORD IN PROCEDURE DIVISION
Explanation: Found a PIC, PICTURE or VALUE clause in the Procedure Division.
User Action: Check the program to find out why this condition occurred.

DCDCA010-D DDNAME (DCDWK02) MISSING
Explanation: The running of DCD IV requires work files DCDWK02 and others. The DDNAME DCDWK02 was not found.
User Action: See JCL examples in the 'Alternate Compile Listing' section in the User's Manual and correct JCL.

DCDCA030-D FILE EMPTY - NO MARBLE HEADER
Explanation: A work file being used is in a corrupted state.
User Action: Try re-running. If necessary, contact Marble Computer.

DCDCADD3-E OVER 500 REPLACING TOKENS WITHIN ONE COPY REPLACING OPERAND - CHECK FOR ERROR IN CODE
Explanation: More than 500 tokens were found when replacing the corresponding tokens in the COPY member before finding a delimiter within pseudo-text-1.
User Action: Check the COPY member and the COPY REPLACING clauses to determine why excessive tokens are being replaced within one pseudo text. If this is a valid condition, contact MARBLE Computer, Inc.

DCDCADD4-I (BY) MISSING IN COPY REPLACING
Explanation: The COPY REPLACING statement at the compiler number shown is missing the word BY following identifier-1 and before identifier-2.
User Action: Inspect the COPY REPLACING clauses within the COBOL program and ensure the word BY is correctly placed.

DCDCADD6-C OVER 500 REPLACING TOKENS WITHIN COPY REPLACING OPERAND - CHECK FOR ERROR IN CODE
Explanation: More than 500 tokens were found when replacing the corresponding tokens in the COPY member before finding a delimiter within pseudo-text-2.
User Action: Check the COPY member and the COPY REPLACING clause to determine why excessive tokens are being replaced within one pseudo text. If this is a valid condition, contact MARBLE Computer, Inc.

DCDCADD9-C OVER 150 REPLACING WITHIN ONE COPY
Explanation: DCD IV has a limit of 150 REPLACING entries within one COPY statement.
User Action: Inspect the COPY statements to determine the cause of excessive REPLACING clauses and ensure there are less than 150 per COPY statement. If this is a valid condition, contact MARBLE Computer, Inc.

DCDCAH03-E INTERNAL TABLE EXCEEDED

Explanation: An internal table was exceeded when expanding COPY members.
User Action: Contact Marble Computer.

DCDCAH06-E DATA SET NAME FOR COPYLIB NOT SPECIFIED, RUN TERMINATED
Explanation: A data set name (DSNAME=) was not provided on the //COPYLIB DD card.
User Action: Ensure that a DSN=clause is provided on the COPYLIB DD statement and check correct placement of the //COPYLIB card.

DCDCAX01-W COPY REPLACING OPTION IGNORED FOR NESTED COPIES (member-name)
Explanation: COPY REPLACING is not allowed within NESTED COPYs.
User Action: Determine why COPY REPLACING is used in NESTED COPYs and take any appropriate action.

DCDCAX02-E COPY MEMBER NAME (member-name) APPEARS EARLIER WITHIN THIS ENTIRE NESTED COPY
Explanation: Within nested COPYs, a COPY may not name a member already brought in through nested copies above it. The member-name shown is already brought in. If brought in again, it will result in generating endless lines of code.
User Action: Examine why this is happening and correct.

DCDCAX05-I ERROR WHEN RESOLVING COPY MEMBER (member-name) SEE FOLLOWING MESSAGE
Explanation: DCD IV is unable to resolve the COPY member listed above.
User Action: Look for another (more specific) message following this one.

DCDCAX06-E COPY MEMBER (member-name) NOT FOUND IN COPYLIB SPECIFIED
Explanation: When DCD IV attempted to read the COPY member in the COBOL program, it was not found in the partitioned data set specified by DSN= in the COPYLIB DD.
User Action: Check the COPY member name to ensure it is valid and that the correct PDS file is specified within the DSN= in the COPYLIB DD.

DCDCAX07-D //COPYLIB DD IS MISSING OR INCORRECT
Explanation: A data set name (DSNAME=) was not provided on the //COPYLIB DD card.
User Action: Ensure that a DSN= clause is provided on the COPYLIB DD statement and check to be sure the placement of the //COPYLIB card is correct.

DCDCAX08-E UNSUCCESSFUL READ WHILE READING RECORD FROM COPY MEMBER (member-name)
Explanation: The COPY member shown was found within the directory of the PDS specified, however, attempts to read it are unsuccessful.
User Action: Ensure that a valid partitioned data set was provided in the COPYLIB DD statement and verify that the member specified is there and can be read successfully.

DCDCAX09-E UNSUCCESSFUL READ WHEN READING DIRECTORY OF DSN SPECIFIEDIN //COPYLIB DD
Explanation: A problem was encountered when reading the directory of the partitioned data set provided in the DSN= of the COPYLIB DD.
User Action: Ensure the PDS specified in the DSN= field is a valid PDS and that the directory is able to be read.

DCDCAX10-E NO RECORDS FOUND IN MEMBER (copy member name)
Explanation: When DCD IV attempted to resolve this COPY member, it found no records in the member.
User Action: Check the COPY member and make corrections as necessary.

DCDCCT01-I WHEN HANDLING REPLACING WITHIN A COPY, A CONTINUATION TO A NEW LINE IS FORCED AT COMPILER # (compiler #)
Explanation: An informational message indicating that a new COBOL line was created to adequately handle the REPLACING on this line.
User Action: None.

DCDCCY06-I ERROR WHEN RESOLVING COPY MEMBER (copy-member-name)
Explanation: Indicates that an error has occurred in resolving a COPY member.
User Action: Look for an associated error message more descriptive in nature than this one.

DCDCCY07-E COPY MEMBER (copy-member) NOT FOUND IN COPYLIB SPECIFIED
Explanation: The COPY member name specified was not found in the data sets provided within the COPYLIB DD.
User Action: Either correct the spelling of the member name or determine why the member is missing.

DCDCCY08-D //COPYLIB DD IS MISSING OR INCORRECT
Explanation: A DSN was not found in the JCL on the COPYLIB DD statement or the DD is missing.

User Action: Correct the JCL and rerun.

DCDCCY09-E **UNSUCESSFUL READ WHILE READING RECORD FROM COPY MEMBER (copy-member)**
Explanation: An error occurred during the read of a record of the COPY member shown within the record.
User Action: Determine if the COPY member in question has an I/O problem that can be easily fixed. If so, correct, otherwise, contact System Support at your installation.

DCDCCY0A-E **UNSUCCESSFUL READ WHEN READING DIRECTORY OF DSN SPECIFIED IN //COPYLIB DD**
Explanation: An error occurred during the read of a directory of the data set specified within the COPYLIB DD.
User Action: Contact System Support at your installation for help.

DCDCCY0B-E **NO RECORDS FOUND IN COPY MEMBER (copy member name)**
Explanation: When DCD IV attempted to resolve this COPY member, it found no records in the member.
User Action: Check the COPY member and make corrections as necessary.

DCDCFE01-E **PROBLEM IN RESOLVING NESTED COPY MEMBER (member name) - CONTINUING...**
Explanation: When DCD IV attempted to resolve this COPY member, it could not find the member specified.
User Action: Check to see why the COPY member is missing.

DCDCG010-D **DDNAME (PCWKCOPY) MISSING**
Explanation: The DDNAME (PCWKCOPY) is missing from JCL the PROC currently being used to create the 'Alternate Compile Listing'. See newer JCL DDNAMES required by release 4.0 or later of DCD IV.
User Action: Get newer DDNAMES added to DCD JCL PROCS.

DCDCGX05-I **ERROR WHEN RESOLVING COPY MEMBER (member-name) SEE FOLLOWING MESSAGE**
Explanation: DCD IV is unable to resolve the COPY member listed above.
User Action: Look for another (more specific) message following this one.

DCDCGX06-E **COPY MEMBER (member-name) NOT FOUND IN COPYLIB SPECIFIED**
Explanation: When DCD IV attempted to read the COPY member in the COBOL program, it was not found in the partitioned data set specified by DSN= in the COPYLIB DD.
User Action: Check the COPY member name to ensure it is valid and that the correct PDS file is specified within the DSN= in the COPYLIB DD.

DCDCGX07-D **//COPYLIB DD IS MISSING OR INCORRECT**
Explanation: A data set name (DSNAME=) was not provided on the //COPYLIB DD card.
User Action: Ensure that a DSN= clause is provided on the COPYLIB DD statement and check to be sure the placement of the //COPYLIB card is correct.

DCDCGX08-E **UNSUCCESSFUL READ WHILE READING RECORD FROM COPY MEMBER (member-name)**
Explanation: The COPY member shown was found within the directory of the PDS specified, however, attempts to read it are unsuccessful.
User Action: Ensure that a valid partitioned data set was provided in the COPYLIB DD statement and verify that the member specified is there and can be read successfully.

DCDCGX09-E **UNSUCCESSFUL READ WHEN READING DIRECTORY OF DSN SPECIFIEDIN //COPYLIB DD**
Explanation: A problem was encountered when reading the directory of the partitioned data set provided in the DSN= of the COPYLIB DD.
User Action: Ensure the PDS specified in the DSN= field is a valid PDS and that the directory is able to be read.

DCDCGX10-E **NO RECORDS FOUND IN MEMBER (copy member name)**
Explanation: When DCD IV attempted to resolve this COPY member, it found no records in the member.
User Action: Check the COPY member and make corrections as necessary.

DCDCR020-E **FILE EMPTY - NO MARBLE HEADER**
Explanation: The first record of a work file being read does not contain a MARBLE header record.
User Action: Look for possible previous messages to this one. Look for an error in the JCL used.

DCDEB040-D **ENTIRE COBOL PROGRAM INCLUDING PROCEDURE DIVISION WAS NOT FOUND**
Explanation: The PROCEDURE DIVISION was not found within this program.
User Action: Determine why PROCEDURE DIVISION was not found and re-submit.

DCDEBM02-D **EXCEEDED MAXIMUM NUMBER OF COPYS THAT CAN BE HANDLED - CONTACT MARBLE COMPUTER**
Explanation: A large internal table was exceeded. This is an unusual exception.
User Action: Contact Marble Computer.

DCDEF016-D & DCDEF017-D & DCDEF018-D & DCDEF019-D **DDNAME (DCDWK0x) MISSING**
Explanation: The running of DCD IV requires work files for processing. The DDNAMEs DCDWK03, DCDWK04, DCDWK05, and DCDWK06 respectively were not found.
User Action: See JCL examples in the 'Alternate Compile Listing' section in the User's Manual and correct JCL.

DCDEF030-C **PROGRAM-ID NOT FOUND IN INPUT FILE - LOOK FOR NON-COBOL FILE OR MISSING PROGRAM-ID IN MARGIN-A**
Explanation: The PROGRAM-ID clause with Program-id within the Identification Division was not found. Program-Id is used within internal processing of DCD IV and is needed.
User Action: Check the program and see why this occurred.

DCDEFB01-W **NO PERIOD PRECEDING LEVEL NUMBER (nn)**
Explanation: A period did not immediately precede this level number.
User Action: Check the previous line for a missing period.

DCDEFB02-C **DATA NAME DOES NOT FOLLOW LEVEL NUMBER (nn)**
Explanation: A level number was found and an expected data name following level number was not found.
User Action: Check the line and make corrections as necessary.

DCDEFB03-C **(01) FOUND IN MARGIN B - IGNORING**
Explanation: The 01 level number found is within margin B, in column 12 or beyond. This 01 is being ignored as being a valid 01 level number.
Action: Check the line and make corrections if this is really a 01 level number.

DCDEFB66-W **NO PERIOD PRECEDING LEVEL NUMBER (66)**
Explanation: A period did not immediately precede this level number.
Action: Check the previous line for a missing period.

DCDEFB67-C **DATA-NAME DOES NOT FOLLOW 66 LEVEL - BYPASSING**
Explanation: Level 66 found with no data name following it.
Action: Check the line and make corrections if this is really a 66 level number.

DCDEFB68-C **RENAMES EXPECTED WITHIN 66 LEVEL AND NOT FOUND - BYPASSING**
Explanation: The syntax of 66 (RENAME) statement requires a data name to follow RENAMES word.
Action: Check the syntax of 66 level line.

DCDEFB69-C **TOKEN PAST RENAMES NOT ALPHANUMERIC**
Explanation: The 66 level clause at the compiler number shown contains data following the COBOL verb, RENAMES that is not alphanumeric.
User Action: Check the line and make corrections as necessary.

DCDEFB77-W **NO PERIOD PRECEDING LEVEL NUMBER (level #)**
Explanation: The 77 level number at the compiler number shown is not preceded by a period.
User Action: Check the line preceding the level number for a missing period and correct.

DCDEFB78-C **DATA NAME DOES NOT FOLLOW LEVEL NUMBER (level #) - BYPASSING**
Explanation: The 77 level number at the compiler number shown is not followed by a data name.
User Action: Check the line and make corrections as necessary.

DCDEFB79-W **(77) FOUND IN MARGIN B – ACCEPTED**
Explanation: The 77 level number found at the compiler number shown is in margin B. It should be to the left of margin B.
User Action: Move the level number to the left of margin B or check the line and make corrections as necessary.

DCDEFB88-W **NO PERIOD PRECEDING 88 LEVEL NUMBER (level #) - ACCEPTING**
Explanation: The 88 level number at the compiler number shown is not preceded by a period.
User Action: Check the line preceding the level number for a missing period and correct.

DCDEFB89-W **DATA NAME DOES NOT FOLLOW 88 LEVEL NUMBER (level #) - BYPASSING**

Explanation: The 88 level number at the compiler number shown is not followed by a data name.
User Action: Check the line and make corrections as necessary.

DCDEFB90-W (88) FOUND IN MARGIN A – ACCEPTED
Explanation: The 88 level number found at the compiler number shown is in margin A. It should be to the right of margin A.
User Action: Move the level number to margin B or check the line and make corrections as necessary.

DCDEFB92-E VALUE CLAUSE MISSING IN 88 LEVEL - BYPASSING
Explanation: The 88 level number and clause at the compiler number shown must contain the word VALUE.
User Action: Check the line and make corrections as necessary.

DCDEFB93-E CANNOT FIND LITERAL AFTER (VALUE) - BYPASSING
Explanation: The 88 level number and clause at the compiler number shown must contain a literal following the word VALUE.
User Action: Check the line and make corrections as necessary.

DCDEFG23-E PROBLEM IN RESOLVING OCCURS AT COMPILER # (compiler #) **SEE BELOW**
LEVEL NUMBER = (level #) PRIOR END LOCATION = (location)
NUMBER OF OCCURS = (nnn) CURRENT END LOCATION = (location)
Explanation: An error was found in resolving an OCCURS clause. More information will be displayed underneath this message.
User Action: Look for a syntax error. If none can be found, contact MARBLE Computer, Inc. for support.

DCDEFG32-C GROUP LEVEL NAME BYPASSED FOR PURPOSES OF CALCULATING RECORD POSITIONS DUE TO SYNTAX ERROR
Explanation: A problem was encountered in resolving the record positions for a group item. More information will be displayed underneath this message.
User Action: Look for a syntax error. If none can be found, contact MARBLE Computer, Inc. for support.

DCDEH01A-E (SYNTAX) ERROR - (MOVE)
Explanation: The MOVE statement found at the compiler number shown has the reserved word TO missing or misplaced.
User Action: Look at the line in question and make any necessary corrections.

DCDEH01B-C THE END OF A (MOVE) STATEMENT IS INCOMPLETE OR CONTAINS AN UNRECOGNIZED SPECIAL REGISTER
Explanation: The MOVE statement found at the compiler number is incomplete.
User Action: Look at the line in question and make any necessary corrections.

DCDEH03A-C FILENAME FOLLOWING A (READ) VERB IS NOT ALPHANUMERIC – ACCEPTED AS IS
Explanation: A valid file name following the COBOL verb READ is expected at the compiler number shown. The file name found is in question because it is not alphanumeric.
User Action: Check the file name and correct as necessary.

DCDEH03B-E NO FD ENTRIES FOUND FOR THE FILENAME (FD name)
Explanation: DCD IV has no FILE FDs in its internal table to match to the file name found in the READ statement at the compiler number shown.
User Action: Check spelling and if necessary, check the Environment and Data Divisions for a valid FD or SD to match the name used.

DCDEH03C-E NO MATCHING FILE-NAME FOR (filename)
Explanation: The file name found after the READ statement at the compiler number shown does not match to a FD file name within the Data Division.
User Action: Check the file name and correct to match a file name in the Environment and Data Divisions.

DCDEH03D-C (INTO IDENTIFIER-1) IDENTIFIER-1 NOT ALPHANUMERIC - ACCEPTED AS IS
Explanation: The record name following the word INTO in a READ statement is not alphanumeric at the compiler number shown.
User Action: Check the record name and correct as necessary.

DCDEH04A-C NAME FOLLOWING (WRITE) IS NOT ALPHANUMERIC - ACCEPTED AS IS
Explanation: The record name following the verb WRITE is not alphanumeric at the compiler number shown.
User Action: Check the record name and correct as necessary.

DCDEH04B-C (FROM IDENTIFIER-1) IDENTIFIER -1 NOT ALPHPANUMERIC - ACCEPTED AS IS

Explanation: The identifier that follows the word FROM in a WRITE statement is not alphanumeric at the compiler number shown.
User Action: Check the identifier and make corrections as necessary.

DCDEH05A-C IDENTIFIER FOLLOWING (ACCEPT) NOT ALPHANUMERIC - ACCEPTED AS IS
Explanation: The identifier that follows the COBOL verb ACCEPT at the compiler number shown is not alphanumeric.
User Action: Check the identifier and make corrections as necessary.

DCDEH06A-E THE (ADD) STATEMENT REQUIRES A (TO) OR (GIVING) AND NEITHER WAS FOUND – BYPASSING
Explanation: The ADD statement at the compile number shown is missing the word, TO or GIVING.
User Action: Check the ADD statement and correct as necessary.

DCDEH06B-E THE END OF THE (ADD) STATEMENT IS INCOMPLETE OR CONTAINS AN UNRECOGNIZED SPECIAL REGISTER - BYPASSING
Explanation: The ADD statement at the compiler number shown is incomplete.
User Action: Check the ADD statement and correct as necessary.

DCDEH07A-E THE (SUBTRACT) STATEMENT HERE REQUIRES THE WORD (FROM) AND IT WAS NOT FOUND – BYPASSING
Explanation: The SUBTRACT statement at the compiler number shown requires the word FROM to ensure correct syntax.
User Action: Check the SUBTRACT statement and correct as necessary.

DCDEH07B-E THE END OF THIS (SUBTRACT) STATEMENT IS INCOMPLETE OR CONTAINS AN UNRECOGNIZED SPECIAL REGISTER - BYPASSING
Explanation: The SUBTRACT statement at the compiler number shown appears to be incomplete.
User Action: Check the SUBTRACT statement and correct as necessary.

DCDEH08A-E THE (MULTIPLY) STATEMENT REQUIRES (BY) - BYPASSING
Explanation: The MULTIPLY statement at the compiler number shown is missing the word BY.
User Action: Check the MULTIPLY statement and correct as necessary.

DCDEH08B-E THE (MULTIPLY) STATEMENT IS INCOMPLETE - BYPASSING
Explanation: The MULTIPLY statement at the compiler number shown is incomplete.
User Action: Check the MULTIPLY statement and correct as necessary.

DCDEH09A-E THE (DIVIDE) STATEMENT REQUIRES (BY) OR (INTO) - BYPASSING
Explanation: The DIVIDE statement at the compiler number shown requires the word BY or INTO to ensure correct syntax.
User Action: Check the DIVIDE statement and make corrections as necessary.

DCDEH09B-E THE (DIVIDE) STATEMENT IS INCOMPLETE - BYPASSING
Explanation: The DIVIDE statement at the compiler number shown is incomplete.
User Action: Check the DIVIDE statement and make corrections as necessary.

DCDEH10A-E THE (COMPUTE) STATEMENT REQUIRES (=) AND THIS WAS NOT FOUND – BYPASSING
Explanation: The COMPUTE statement at the compiler number shown is incomplete and requires the symbol (=) or the word EQUAL or EQUALS for correct syntax.
User Action: Check the COMPUTE statement and correct.

DCDEH10B-E THE (COMPUTE) STATEMENT IS INCOMPLETE - BYPASSING
Explanation: The COMPUTE statement at the compiler number shown is incomplete.
User Action: Check the COMPUTE statement and correct.

DCDEH11A-C FILE-NAME AFTER CLOSE (file-name) NOT ALPHANUMERIC - ACCEPTED
Explanation: The file name following the COBOL verb CLOSE at the compiler number shown is not alphanumeric.
User Action: Check the CLOSE statement and make corrections as necessary.

DCDEH11B-C FILE -NAME AFTER CLOSE (file-name) NOT ALPHANUMERIC - ACCEPTED
Explanation: The file name following the COBOL verb CLOSE at the compiler number shown is not alphanumeric.
User Action: Check the CLOSE statement and make corrections as necessary.

DCDEH12A-C FILE-NAME AFTER DELETE (file-name) NOT ALPHANUMERIC - ACCEPTED
Explanation: The file name following the COBOL verb DELETE at the compiler number shown is not alphanumeric.

User Action: Check the DELETE statement and make corrections as necessary.

DCDEH14A-C IDENTIFIER AFTER EXAMINE (field-contents) NOT ALPHANUMERIC - ACCEPTED
Explanation: The field name found after the COBOL verb EXAMINE at the compiler number shown is not alphanumeric.
User Action: Check the EXAMINE statement and correct as necessary.

DCDEH14B-C (EXAMINE) FOUND (field-contents) FOR (TALLYING) OR (REPLACING) - BYPASSED
Explanation: The EXAMINE statement at the compiler number shown is missing the word TALLYING, REPLACING or is incorrect.
User Action: Check the EXAMINE statement and correct as necessary.

DCDEH14C-C EXAMINE WITH JUST REPLACING REQUIRES (BY); FOUND (field-contents) BYPASSING
Explanation: The EXAMINE statement at the compiler number shown is missing the word BY.
User Action: Check the EXAMINE statement and correct as necessary.

DCDEH15A-C (EXHIBIT) REQUIRES (NAMED) OR (CHANGED) - ACCEPTED AS IS
Explanation: The EXHIBIT statement at the compiler number shown requires the word NAMED, CHANGED or both to ensure correct syntax.
User Action: Check the EXHIBIT statement and correct as necessary.

DCDEH22A-C THE SYNTAX FOR AN OPEN STATEMENT IS INCOMPLETE
Explanation: The syntax found for the OPEN statement at this compiler line number is invalid.
User Action: Look at the OPEN statement and determine the cause of the error.

DCDEH22B-C EXPECTING INPUT, OUTPUT, I-O OR EXTEND - FOUND (field-contents) -TREATED AS (OUTPUT)
Explanation: The field shown was found after the verb OPEN.
User Action: If this is correct, ignore or contact MARBLE Computer, Inc. If not, correct as necessary.

DCDEH22C-C & DCDEH22D-C THE FILE-NAME (file-name) IS NOT ALPHANUMERIC – ACCEPTED AS IS
Explanation: The file name found after the COBOL verb OPEN at the compiler number shown is not alphanumeric.
User Action: Check the OPEN statement and correct as necessary.

DCDEH23A-E THE FORMAT OF THIS (SET) STATEMENT IS UNRECOGNIZED - BYPASSING
Explanation: Two forms of the SET statement are recognized: (SET index-name TO ?) and (SET index-name UP [or DOWN] BY ?).
User Action: Correct this SET statement as necessary.

DCDEH24A-C IDENTIFIER AFTER (INSPECT) - (field-contents) NOT ALPHANUMERIC - ACCEPTED
Explanation: The identifier found after the COBOL verb INSPECT at the compiler number shown is not alphanumeric.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24B-C EXPECTING (TALLYING) OR (REPLACING) - FOUND (field-contents) – BYPASSING
Explanation: At the compiler number shown, the item found after the first identifier in the INSPECT statement is not REPLACING, TALLYING or CONVERTING.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24C-C IDENTIFIER AFTER INSPECT TALLYING (field-contents) NOT ALPHANUMERIC - ACCEPTED
Explanation: In the INSPECT statement at the compiler number shown, the identifier following the word TALLYING was not alphanumeric.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24D-C (FOR) MISSING IN INSPECT TALLYING, FOUND (field-contents) - RESULTS UNPREDICTABLE
Explanation: The INSPECT statement at the compiler number shown is missing the word FOR following the second identifier.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24E-C EXPECTING (CHARACTERS), (ALL) OR (LEADING) FOUND (field-contents)
Explanation: The INSPECT statement at the compiler number shown is missing the word ALL, CHARACTERS or LEADING following the word FOR.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24F-C **EXPECTING ALL, LEADING, FIRST, OR CHARACTERS; FOUND (field-contents)**
Explanation: The INSPECT . . . REPLACING statement at the compiler number shown is missing a COBOL word.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24G-C **INSPECT WITH (CONVERTING) REQUIRES (TO); FOUND (field-contents)**
Explanation: The INSPECT . . . CONVERTING statement found at the compiler number shown requires the word TO following the second identifier.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24H-C **EXPECTING (BY) AFTER (CHARACTERS) - FOUND (field-contents)**
Explanation: The INSPECT . . . REPLACING CHARACTERS statement at the compiler number shown requires the word BY after the word CHARACTERS for correct syntax.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH24I-C **INSPECT WITH (REPLACING) REQUIRES (BY); FOUND (field-contents) - CONTINUING**
Explanation: The INSPECT . . . REPLACING statement at the compiler number shown requires the word BY after the identifier that follows REPLACING.
User Action: Check the INSPECT statement and correct as necessary.

DCDEH25A-C **EXPECTING ALPHANUMERIC FILE-NAME; FOUND (file-name) - ACCEPTED AS IS**
Explanation: The file name following the COBOL verb MERGE at the compiler number shown is not alphanumeric.
User Action: Check the MERGE statement and make corrections as necessary.

DCDEH25B-E **NO SD ENTRIES FOUND FOR (SD data-name)**
Explanation: The file name used at the compiler number shown does not match a file name in the Data Division.
User Action: Check the file name and make corrections as necessary.

DCDEH25C-E **NO MATCHING FILE-NAME FOUND FOR (file-name)**
Explanation: The file name used at the compiler number shown does not match a file name in the Data Division.
User Action: Check the file name and make corrections as necessary.

DCDEH25D-C **EXPECTING (ASCENDING) OR (DESCENDING) FOUND (field-contents)**
Explanation: The MERGE . . . ON statement at the compiler number shown must be followed by the word ASCENDING or DESCENDING.
User Action: Check the MERGE statement and make the corrections as necessary.

DCDEH25E-E **EXPECTING (USING) IN (MERGE) STMT-FOUND (field-contents) - BYPASSING**
Explanation: The MERGE statement at the compiler number shown must be followed by the word, GIVING.
User Action: Check the MERGE statement and make corrections as necessary.

DCDEH25F-E **EXPECTING (OUTPUT) OR (GIVING) - FOUND (field-contents)**
Explanation: The MERGE statement at the compiler number shown must be followed by the words, OUTPUT or GIVING, for this statement to have correct syntax.
User Action: Check the MERGE statement and make corrections as necessary.

DCDEH25G-C **(PROCEDURE) IS MISSING AFTER (OUTPUT) - CONTINUING**
Explanation: The MERGE . . . OUTPUT statement at the compiler number shown is missing the word, PROCEDURE after OUTPUT.
User Action: Check the MERGE statement and make corrections as necessary.

DCDEH25H-C **MERGE KEY IS NOT ALPHANUMERIC (key) - ACCEPTED**
Explanation: The MERGE statement at the compiler number shown contains a key which is not alphanumeric.
User Action: Check the MERGE statement and make corrections as necessary.

DCDEH26A-C **FILE NAME FOLLOWING (RECEIVE) IS NOT ALPHANUMERIC - ACCEPTED AS IS**
Explanation: The RECEIVE statement at the compiler number shown contains a file name which is not alphanumeric.
User Action: Check the RECEIVE statement and make corrections as necessary.

DCDEH26B-E **NO FD ENTRIES FOR (file-name)**
Explanation: The File name found at the compiler number shown does not match a file name in the FD section of the Data Division.
User Action: Check the RECEIVE statement at the compiler number shown and make corrections as necessary.

DCDEH26C-E **NO MATCHING FILE-NAME FOR (file-name)**
Explanation: The file name found at the compiler number shown does not match a file name in the Data Division.
User Action: Check the RECEIVE statement at the compiler number shown and make corrections as necessary.

DCDEH26D-C **(INTO IDENTIFIER-1) IDENTIFIER-1 NOT ALPHANUMERIC - ACCEPTED AS IS**
Explanation: The identifier found at the compiler number shown is not alphanumeric.
User Action: Check the RECEIVE . . . INTO statement and correct as necessary.

DCDEH27A-C **(SEARCH) OPERAND IS NOT ALPHANUMERIC – ACCEPTED AS IS**
Explanation: The operand or identifier following the COBOL verb SEARCH at the compiler number shown is not alphanumeric.
User Action: Check the SEARCH statement and correct as necessary.

DCDEH28A-C **RECORD NAME FOLLOWING (SEND) NOT ALPHANUMERIC - ACCEPTED AS IS**
Explanation: The SEND statement at the compiler number shown contains a record name which is not alphanumeric.
User Action: Check the SEND statement and correct as necessary.

DCDEH28B-C **(FROM IDENTIFIER-1) IDENTIFIER-1 NOT ALPHANUMERIC - ACCEPTED AS IS**
Explanation: The SEND . . . FROM statement at the compiler number shown contains an identifier following the word FROM that is not alphanumeric.
User Action: Check the SEND statement and correct as necessary.

DCDEF29A-C **FILE NAME (file-name) IS NOT ALPHANUMERIC AFTER (SORT) - ACCEPTED AS IS**
Explanation: The SORT statement at the compiler number shown contains a non-alphanumeric file name.
User Action: Check the SORT statement and correct as necessary.

DCDEF29B-E **NO MATCHING SD ENTRIES FOUND FOR (SD name)**
Explanation: The SORT statement at the compiler number shown contains a file name for the sort that does not match a file name for an SD in the Data Division.
User Action: Check the SORT statement and correct as necessary.

DCDEH29C-E **NO MATCHING FILE-NAME FOUND FOR (file-name)**
Explanation: The SORT statement at the compiler number shown contains a file name that does not match a file name in the Data Division.
User Action: Check the SORT statement and correct as necessary.

DCDEH29D-C **EXPECTING (ASCENDING) OR (DESCENDING) - FOUND (field-contents)**
Explanation: The SORT statement at the compiler number shown is missing the word ASCENDING or DESCENDING following the name of the sort file and the word ON.
User Action: Check the SORT statement and correct as necessary.

DCDEH29E-E **EXPECTING (USING) or (INPUT) - FOUND (field-contents)**
Explanation: The SORT statement at the compiler number shown is missing the word INPUT or USING.
User Action: Check the SORT statement and correct as necessary.

DCDEH29F-E **(OUTPUT) OR (GIVING) NOT FOUND WITHIN (SORT)**
Explanation: The SORT statement at the compiler number shown is missing the word GIVING or OUTPUT.
User Action: Check the SORT statement and correct as necessary.

DCDEH29G-C **PROCEDURE) IS MISSING AFTER (OUTPUT) - CONTINUING**
Explanation: The SORT statement at the compiler number shown is missing the word PROCEDURE after OUTPUT.
User Action: Check the SORT statement and correct as necessary

DCDEH29H-C **SORT KEY IS NOT ALPHANUMERIC (sort-key) - ACCEPTED**
Explanation: The SORT statement at the compiler number shown contains a sort key that is not alphanumeric.
User Action: Check the SORT statement and correct as necessary.

DCDEH30A-C **EXPECTING ALPHANUMERIC FILE NAME AFTER (START) - FOUND (file-name)**
Explanation: The START statement at the compiler number shown contains a file name that is not alphanumeric.
User Action: Check the START statement and make corrections as necessary.

DCDEH30B-E & DCDEH30C-E **NO MATCHING FD ENTRY FOUND FOR (file-name)**
Explanation: The START statement at the compiler number shown contains a file name that does not match a file name in the FD section of the Data Division.
User Action: Check the START statement and make corrections as necessary.

DCDEH30D-C **(OR) WITHIN (START) REQUIRES (=), FOUND (field-contents)**
Explanation: The START statement at the compiler number shown contains the word OR which must be followed by the phrase EQUAL TO for correct syntax.

User Action: Check the START statement and make corrections as necessary.

DCDEH31A-C FILE-NAME FOLLOWING (SEEK) NOT ALPHANUMERIC - ACCEPTED AS IS
Explanation: The SEEK statement at the compiler number shown contains a file name that is not alphanumeric.
User Action: Check the SEEK statement and make corrections as necessary.

DCDEH31B-E & DCDEH31C-E NO MATCHING FD ENTRIES FOUND FOR (file-name)
Explanation: The SEEK statement at the compiler number shown contains a file name that does not match a file name in the FD section of the Data Division.
User Action: Check the SEEK statement and make corrections as necessary.

DCDEH32A-C EXPECTING (INTO) FOUND (field-contents)
Explanation: The STRING statement at the compiler number shown is missing the word INTO after the items that are being strung together.
User Action: Check the STRING statement and make corrections as necessary.

DCDEH32B-C DATA-NAME AFTER (INTO) NOT ALPHANUMERIC - ACCEPTED
Explanation: The STRING statement at the compiler number shown contains a non-alphanumeric data name following the word INTO.
User Action: Check the STRING statement and make corrections as necessary.

DCDEH32C-C VALID DATA -NAME SHOULD FOLLOW (WITH POINTER) IN (STRING)
Explanation: The STRING statement at the compiler number shown contains a non-alphanumeric data name following the WITH POINTER clause or the data name is missing or invalid.
User Action: Check the STRING statement and make corrections as necessary.

DCDEH33A-C IDENTIFIER AFTER TRANSFORM (field-contents) NOT ALPHANUMERIC - ACCEPTED
Explanation: The TRANSFORM statement at the compiler number shown contains an identifier that is not alphanumeric.
User Action: Check the TRANSFORM statement and make corrections as necessary.

DCDEH33B-E (FROM) EXPECTED - FOUND (field-contents) BYPASSING
Explanation: Expecting the word FROM at this point within the TRANSFORM statement.
User Action: Check the TRANSFORM statement and make corrections as necessary.

DCDEH33C-E EXPECTING (TO) - FOUND (field-contents)
Explanation: Expecting the word TO at this point within the TRANSFORM statement.
User Action: Check the TRANSFORM statement and make corrections as necessary.

DCDEH34A-C IDENTIFIER (field-contents) IS NOT ALPHANUMERIC
Explanation: The UNSTRING statement at the compiler number shown contains an identifier which is not alphanumeric.
User Action: Check the UNSTRING statement and make corrections as necessary.

DCDEH34B-E (INTO) FOR (UNSTRING) NOT FOUND
Explanation: The UNSTRING statement at the compiler number shown is missing the word INTO or has the word misplaced.
User Action: Check the UNSTRING statement and make corrections as necessary.

DCDEH35A-C & DCDEH35B-C NAME AFTER (USING) NOT ALPHANUMERIC - ACCEPTED AS IS
Explanation: The ENTRY statement at the compiler number shown contains a data name following the word USING which is not alphanumeric.
User Action: Check the ENTRY statement and make corrections as necessary.

DCDEH40A-C THE DATA-NAME FOLLOWING INITIALIZE (identifier) IS NOT ALPHANUMERIC-ACCEPTED AS IS
Explanation: The INITIALIZE statement at the compiler number shown contains an identifier that is not alphanumeric.
User Action: Check the INITIALIZE statement and make corrections as necessary.

DCDEH40B-E THE OPERAND AFTER REPLACING (field-contents) IS UNKNOWN - BYPASSING INITIALIZE
Explanation: The INITIALIZE statement at the compiler number shown contains an operand following the word REPLACING that is misspelled or unrecognized.
User Action: Check the INITIALIZE statement and make corrections as necessary.

DCDEH40C-E **EXPECTING (BY) AFTER REPLACING, FOUND (field-contents) - BYPASSING INITIALIZE**
Explanation: The INITIALIZE statement at the compile number shown contains an unrecognized word following the word REPLACING.
User Action: Check the INITIALIZE statement and make corrections as necessary.

DCDEH46A-C **EXPECTING ALPHANUMERIC FIELD IN MARGIN B AFTER (EXEC field-contents) -FOUND (field-contents) ACCEPTED**
Explanation: The EXEC statement at the compiler number shown contains a data name that is not alphanumeric or is not in the correct margin.
User Action: Check the EXEC statement and make corrections as necessary.

DCDEH46B-C **EXPECTING ALPHANUMERIC FIELD PRIOR TO LEFT PARENTHESIS - FOUND (Field-contents)**
Explanation: The EXEC statement at the compiler number shown contains a field to the left of the left parenthesis that is not alphanumeric.
User Action: Check the EXEC statement and make corrections as necessary.

DCDEH46C-E **EXCESSIVE PARAMETERS BYPASSED IN (EXEC) STMT**
Explanation: An excessive number of parameters were used within one EXEC statement.
User Action: Determine why an excessive number was used and correct. If already correct, contact MARBLE Computer, Inc.

DCDEH46D-E **EXPECTING QUALIFIER NAME AFTER (OF) OR (IN) (EXEC) STMT -BYPASSING QUALIFICATION**
Explanation: The EXEC statement at the compile number shown is missing a qualifier name after OF or IN.
User Action: Check the EXEC statement and make corrections as necessary.

DCDEH46E-C **EXCESSIVE QUALIFICATION FOR (EXEC) STATEMENT FOUND – PROCESSING CONTINUING**
Explanation: An excessive number of qualifiers were used within one EXEC statement.
User Action: Determine why an excessive number was used and correct. If already correct, contact MARBLE Computer, Inc.

DCDEH51A-E **ALTER STATEMENT MISSING WORD (TO)**
Explanation: The ALTER statement at the compiler number shown is missing the word TO after the first procedure name.
User Action: Check the ALTER statement and make corrections as necessary.

DCDEH51B-E **ALTER STATEMENT MISSING PROCEDURE-NAME-2**
Explanation: The ALTER statement at the compiler number shown is missing procedure-name-2 following the word TO.
User Action: Check the ALTER statement and make corrections as necessary.

DCDEH57A-C **(STOP) REQUIRES (RUN) OR (LITERAL)**
Explanation: The STOP statement at the compiler number shown is missing the word RUN or a literal following it.
User Action: Check the STOP statement and make corrections as necessary.

DCDEH60A-C **DATA-NAME FOLLOWING (INITIATE) NOT ALPHANUMERIC - ACCEPTED AS IS**
Explanation: The REPORT WRITER verb INITIATE requires an alphanumeric operand following it. This was not found.
User Action: Check the statement and make necessary corrections.

DCDEH61A-C **DATA-NAME FOLLOWING (GENERATE) NOT ALPHANUMERIC - ACCEPTED AS IS**
Explanation: The REPORT WRITER verb GENERATE requires an alphanumeric operand following it. This was not found.
User Action: Check the statement and make necessary corrections.

DCDEH62A-C **DATA-NAME FOLLOWING (TERMINATED) NOT ALPHANUMERIC - ACCEPTED AS IS**
Explanation: The REPORT WRITER verb TERMINATE requires an alphanumeric operand following it. This was not found.
User Action: Check the statement and make necessary corrections.

DCDEJ10A-I **CONDITIONAL STATEMENT IS INCOMPLETE - IF 88 LEVEL INTENDED, CHECK SPELLING**
Explanation: A conditional statement is incomplete. If an 88 level was intended, a matching 88 level in the Data Division was not found.

User Action: Check the conditional statement and make necessary corrections.

DCDEJ100-I **PARSING CANNOT FIND THE BEGIN OF SECOND PART OF NON-88 CONDITIONAL**
Explanation: A conditional statement is incomplete. If an 88 level was intended, a matching 88 level in the Data Division was not found.
User Action: Check the conditional statement and make necessary corrections.

DCDEJ300-C / & DCDEJ400-C **(IF) EXCEEDED 125 OPERANDS FOR 1 CONDITION**
Explanation: An IF (or IF type) statement contains more than 125 operands within just 1 condition.
User Action: If this is a valid condition, contact MARBLE Computer, Inc.

DCDEJAPA-E & DCDEJAPB-E & DCDEJS1A-C **AN INTERNAL TABLE HAS EXCEEDED 125 DATA-NAMES FOR 1 CONDITION**
Explanation: An IF (or IF type) statement contains more than 125 operands within just 1 condition.
User Action: IF this is a valid condition, contact MARBLE Computer, Inc.

DCDENASA-C **EXCEEDED 75 QUALIFIERS FOR OPERANDS WITHIN JUST 1 CONDITION**
Explanation: More than 75 qualifiers were used within just 1 condition.
User Action: If this is a valid condition, contact MARBLE Computer, Inc.

DCDERW0A-W **NO PERIOD PRECEDING LEVEL NUMBER (level #)**
Explanation: The level number at the compiler number shown does not have a period preceding it on a previous line.
User Action: Check the lines above the level number for a missing period and make corrections as necessary.

DCDERW0B-C **EXPECTING (ZERO) AFTER (BLANK)**
Explanation: The word BLANK at the compiler number shown is missing the word ZERO after it.
User Action: Check the line and make corrections as necessary.

DCDERW0C-C & DCDERW0D-C **EXPECTING NUMERIC INTEGER AFTER (COLUMN)**
Explanation: The word COLUMN at the compiler number shown is missing a numeric integer following it.
User Action: Check the line and make corrections as necessary.

DCDERW0E-C & DCDERW0F-C **EXPECTING NUMERIC INTEGER AFTER (LINE)**
Explanation: The word LINE at the compiler number shown is missing a numeric integer following it.
User Action: Check the line and make corrections as necessary.

DCDERW0G-C **EXPECTING (GROUP) AFTER (NEXT)**
Explanation: The word NEXT at the compiler number shown is missing the word GROUP following it.
User Action: Check the line and make corrections as necessary.

DCDERW0H-C & DCDERW0I-C **EXPECTING NUMERIC INTEGER AFTER (NEXT GROUP)**
Explanation: The phrase NEXT GROUP at the compiler number shown is missing a numeric integer following it.
User Action: Check the line and make corrections as necessary.

DCDERW0J-C **CANNOT FIND VALID PICTURE CLAUSE**
Explanation: Expecting valid PICTURE clause to follow the word PICTURE and instead found data within the margin a field.
User Action: Check the line and make corrections as necessary.

DCDERW0K-E **EXPECTING (TALLY) OR IDENTIFIER AFTER (SUM)**
Explanation: Expecting a valid data name within the SUM clause within REPORT WRITER.
User Action: Check the line and make corrections as necessary.

DCDERW0L-C **EXPECTING IDENTIFIER AFTER (UPON)**
Explanation: Expecting a valid data name within the SUM UPON clause.
User Action: Check the line and make corrections as necessary.

DCDERW0M-E & DCDERW0N-E **EXPECTING (HEADING) OR (FOOTING) AFTER (field-contents)**
Explanation: Expecting the word HEADING or FOOTING within REPORT WRITER at this line.
User Action: Check the line and make corrections as necessary.

DCDERW0P-E **EXPECTING VALID TYPE AFTER (TYPE IS) - FOUND (field-contents)**
Explanation: An invalid entry was found after the TYPE IS clause.
User Action: Check the line and make corrections as necessary.

DCDERW0Q-C **EXPECTING (FINAL) OR IDENTIFIER AFTER (TYPE IS) CLAUSE**
Explanation: Expecting reserved word FINAL or a valid data name to follow the TYPE IS clause in REPORT WRITER.
User Action: Check the line and make corrections as necessary.

DCDERW0R-C **EXPECTING VALID OPERAND FOR USAGE CLAUSE - FOUND (field-contents)**
Explanation: The USAGE clause is in error or contains a type usage unknown to DCD IV.
User Action: Correct USAGE clause or contact MARBLE Computer, Inc. if the USAGE clause is valid.

DCDERW0S-E **EXPECTING LITERAL AFTER (VALUE) - FOUND (field-contents)**
Explanation: The entry following VALUE does not complete the VALUE clause within the REPORT SECTION.
User Action: Determine why the entry is not valid and correct.

DCDERWRA-C **MNEMONIC-NAME AFTER CODE MISSING**
Explanation: The operand following WITH CODE is missing.
User Action: Look at listing and correct.

DCDERWRB-C **EXPECTING INTEGER FOR PAGE CLAUSE**
Explanation: One of the PAGE clauses is missing a number following it.
User Action: Consult the line indicated and correct the format of the PAGE clause.

DCDERWRC-C **EXPECTING INTEGER AFTER (field-contents)**
Explanation: One of the PAGE clauses is missing a number following it.
User Action: Consult the line indicated and correct the format of the PAGE clause.

DCDESDDB-E **NUMERIC INTEGER DOES NOT FOLLOW OCCURS - BYPASSING**
Explanation: The OCCURS clause at the compiler number shown is not followed by a numeric integer.
User Action: Check the OCCURS clause for a missing integer and make corrections as necessary.

DCDESDDC-E **CANNOT FIND VALID ENTRY TO COMPLETE PICTURE CLAUSE - BYPASSING**
Explanation: The PICTURE clause is either continued in an invalid column or is incomplete or incorrect.
User Action: Check the line and make corrections as necessary.

DCDESDDD-E **ALPHANUMERIC DATA-NAME NOT FOUND AFTER REDEFINES - BYPASSING**
Explanation: The data name found after the REDEFINES clause in the Data Division is not alphanumeric.
User Action: Check the line and make corrections as necessary.

DCDESDDF-E **ALPHANUMERIC DATA-NAME NOT FOUND AFTER RENAMES - BYPASSING**
Explanation: The data name that follows the COBOL verb, RENAMES is not alphanumeric.
User Action: Check the RENAMES clause and make corrections as necessary.

DCDESDDG-W **ENTRY FOUND WITHIN USAGE CLAUSE IS EITHER INVALID OR UNRECOGNIZED BYPASSING**
Explanation: The word following the USAGE IS clause is either incorrect or unrecognized.
User Action: Check the USAGE IS clause and make corrections as necessary.

DCDESDDH-E **CANNOT FIND LITERAL AFTER (VALUE) - BYPASSING**
Explanation: The level number and clause at the compiler number shown must contain a literal following the word VALUE.
User Action: Check the line indicated and make any necessary corrections.

DCDESDDI-E **INDEX-NAME IS MISSING OR IS NOT ALPHANUMERIC AFTER (INDEXED BY) CLAUSE-BYPASSING**
Explanation: The INDEXED BY clause at the compiler number shown contains an index name that is not alphanumeric or is missing.
User Action: Check the line and make corrections as necessary.

DCDESDDJ-C **ENTRY FOR PICTURE CLAUSE HAS NON-NUMERIC VALUE WITHIN PARENTHESES - (picture)**
Explanation: The PICTURE clause at the compiler number shown must contain a numeric value within its parentheses.
User Action: Check the PICTURE clause and make corrections as necessary.

DCDESDDL-C **EXPECTING ALPHANUMERIC NAME FOR (REPORT IS) CLAUSE**
Explanation: The REPORT IS clause at the compiler number shown contains a word following it that is not alphanumeric.
User Action: Check the line and make corrections as necessary.

DCDESYLA-E **EXPECTING QUALIFIER TO FOLLOW (OF) OR (IN) - FOUND (field-contents)**
Explanation: Expecting qualifier to follow OF or IN.
User Action: Examine listing and insert qualifier at correct location.

DCDGBA11-E **TABLE LIMITS EXCEEDED REGION**
Explanation: An internal table was not large enough to handle the program being documented.
User Action: Rerun the job with a larger region.

DCDGBB10-E **AN UNMATCHED RECORD IS BEING BYPASSED WHEN MATCHING FILES - LOOK FOR SYNTAX ERROR**
Explanation: Match merging of internal files is either out of sequence or an unmatched record is present. This may be due to a syntax error in the input program.
User Action: Try compiling the program to see if it compiles cleanly. If unsolved, contact MARBLE Computer, Inc.

DCDGDZ10-D **DDNAME (DCDWKT2) IS MISSING WHEN PARM OPTION (DIT) IS SPECIFIED**
Explanation: A necessary DD is missing for an internal work file.
User Action: Insure that DDnames DCDWKT1 through DCDWKT4 are present within the JCL similar to DDnames DCDWK01, DCDWK02, etc.

DCDGDZ20-D **OVER nnnn CTLDLTCC CONTROL CARDS WERE USED – TABLE EXCEEDED**
Explanation: Too many control statements were specified.
User Action: Limit the number of control statements to the number shown in the message printed.

DCDGDZ30-D **OVER 150 CONTROL CARDS WERE ADDED TO THE DIT CONTROL STATEMENT FILE – TABLE EXCEEDED**
Explanation: Too many control statements were specified.
User Action: Use less control statements.

DCDGDZ40-D **OVER 999 DATA NAMES WERE FOUND FOR DOING TRACING ON – TABLE EXCEEDED**
Explanation: When tracing literals one data name with a literal directly to 1000 or more data names, an unusual condition.
User Action: This condition if found and valid may be resolved by contacting MARBLE Computer, Inc.

DCDGF002-D **DDNAME (DCDWK08) MISSING**
Explanation: The running of DCD IV requires work files DCDWK08. The DDNAME DCDWK08 was not found.
User Action: See JCL examples in the 'Alternate Compile Listing' section in the User's Manual and correct JCL.

DCDGJB04-C **EXCESSIVE QUALIFICATION AND/OR SUBSCRIPTING FOUND**
Explanation: Excessive qualification and/or subscripting was found while handling a CORRESPONDING statement at this line number.
User Action: Determine why excessive qualification and/or subscripting is used and attempt to correct. If necessary, contact MARBLE Computer, Inc.

DCDGJN02-W **EXCESSIVE QUALIFICATION AND/OR SUBSCRIPTING FOUND**
Explanation: Excessive qualification and/or subscripting was found while handling a CORRESPONDING statement at this line number.
User Action: Determine why excessive qualification and/or subscripting was used and attempt to correct. If necessary, contact MARBLE Computer, Inc.

DCDGKB04-C **EXCESSIVE QUALIFICATION AND/OR SUBSCRIPTING FOUND**
Explanation: Excessive qualification and/or subscripting was found while handling a CORRESPONDING statement at this line number.
User Action: Determine why excessive qualification and/or subscripting was used and attempt to correct. If necessary, contact MARBLE Computer, Inc.

DCDGKF02-D **FILE EMPTY - NO MARBLE HEADER**
Explanation: The first record of a work file being read does not contain a MARBLE header record.
User Action: Look for possible previous message to this one. Look for an error in the JCL used.

DCDGKH07-C **INSUFFICIENT SPACE TO HANDLE INITIALIZE DATA DIVISION NAMES (H070) - BYPASSING EXCESS NAMES**

Explanation: A table for Data Division NAMES was not large enough to handle the program being documented.
User Action: Contact MARBLE Computer, Inc.

DCDGKN02-C EXCESSIVE QUALIFICATION AND/OR SUBSCRIPTING FOUND
Explanation: Excessive qualification and/or subscripting was found while handling a CORRESPONDING statement at this line number.
User Action: Determine why excessive qualification and/or subscripting was used and attempt to correct. If necessary, contact MARBLE Computer, Inc.

DCDGSA05-E TABLE LIMITS EXCEEDED REGION
Explanation: An internal table was not large enough to handle the program run through DCD IV.
User Action: Rerun the job with a larger region.

DCDGS012-C An Unconditional STOP RUN, GOBACK, or EXIT PROGRAM was not found within the program. Software will make a reasonable assumption to correct. To remove this Warning in future runs insert a *CAT STOP RUN as a comment line in the COBOL program at a place to establish correct end of mainline for use by software in building the Quick View Window.
Explanation: This message will not occur within DCD IV, but in CAT software which uses some DCD IV scanning. It occurs when there is no STOP RUN and there is a CALL or other means to externally STOP the RUN.
User Action: Examine program to see if correct AND insert *CAT STOP RUN starting in column 7 where you think STOP RUN would normally be inserted in the program.

DCDGS015-C The mainline code from PROCEDURE DIVISION begin to first found unconditional program ending verb found nnnnn SET(s) of routines that were performed and reside within this range of code. If this is okay, ignore this warning! If there is an unrecognized CALL or other (non STOP RUN, GOBACK or EXIT PROGRAM) code that ends the mainline routine, see 'Create CAT Stop Run' option under Narrative Selection tab and consider checking that box to establish a CAT corrected end of mainline routine.
Explanation: This message will not occur within DCD IV, but in CAT software which uses some DCD IV scanning. It may occur when there is no or a misplaced STOP RUN type verb and the mainline routine shows performed routines that possibly should not be there.
User Action: Examine program to see if correct AND possibly use 'Create CAT Stop Run' checkbox under Narrative Selection tab where Quick View Window resides.

DCDGSAC0-E MORE THAN 7000 SECTIONS - EXCESS IGNORED IN PAR2 PROGRAM
Explanation: More than 7000 SECTIONs were found within one COBOL program.
User Action: If this is a valid condition, contact Marble Computer.

DCDGSB10-E TABLE LIMITS EXCEEDED REGION
Explanation: An internal table was not large enough to handle the program run through DCD IV.
User Action: Rerun the job with a larger region.

DCDGSE02-E PROGRAM ERROR ON MATCH - CHECK FOR PRIOR TABLE EXCEEDED MESSAGE
Explanation: An internal error has occurred in matching paragraph names. This is probably caused by a previously printed out table exceeded message.
User Action: If no other error messages are shown, contact MARBLE Computer, Inc.

DCDGSFP0-W THE PARAGRAPH (paragraph-name) USED HERE IS NOT FOUND WITHIN THE PROGRAM
Explanation: A matching paragraph name to the one used here is not found within the program.
User Action: Check for a missing name or a spelling error.

DCDGSFS0-W THE SECTION (section-name) USED HERE IS NOT FOUND WITHIN THE PROGRAM
Explanation: A matching section name to the one used is not found within the program.
User Action: Check for a missing name or a spelling error.

DCDGSG03-W / DCDGSG11-W A MATCH WAS NOT FOUND FOR PARAGRAPH NAME (paragraph-name)
Explanation: A matching paragraph name to the one used here is not found within the program.
User Action: Check for a missing name or a spelling error.

DCDGWA03-E EXCESSIVE DYNAMIC CALLS FOUND AT THIS LINE NUMBER – REMAINING BYPASSED
Explanation: Over 3000 dynamic CALLs were found in one program. Those over 3000 will be bypassed.
User Action: Determine why such an excessive number of dynamic CALLs were used in one program and attempt to reduce this number.

DCDGWB02-E EXCESSIVE MATCHING LITERALS TO DYNAMIC CALLS FOUND THIS LINE NUMBER

& DCDGWD02-E
Explanation: The number of VALUE and/or MOVE literals matching to names used in dynamic CALLs exceeds 2000.
User Action: Determine why excessive MOVEs of literal to dynamic CALLs was used in one program and attempt to reduce this number.

DCDHSB11-E MORE THAN (NNNNN) DATA NAMES USED IN THE PROCEDURE DIVISION
Explanation: An internal table was exceeded within DCD and this table needed to be made larger.
User Action: Contact Marble Computer, Inc.

DCDIBCB1-I TRACING TABLE EXCEEDED – SOME TRACING WILL BE LOST
Explanation: An internal table was exceeded within DCD and this table needed to be made larger.
User Action: Contact Marble Computer, Inc.

DCDIBMA0-E INTERNAL 88 LEVEL TABLE EXCEEDED – SOME TRACING MAY BE LOST
Explanation: An internal table was exceeded within DCD and this table needed to be made larger.
User Action: Contact Marble Computer, Inc.

DCDIF030-I NO RECORDS WERE PASSED TO THE SORT FOR THE PROGRAM xxxxxxxx
Explanation: No records were selected for the program shown for Direct Tracing of Literals
User Action: If this is a small program or a small Direct Literal report was anticipated, this may be normal.

DCDJA040-I NO DATA NAMES INTO SORT
Explanation: Probably a very small program was processed resulting in no PROCEDURE DIVISION verbs (Transfer of Control) or (Data Manipulation) were found.
User Action: None.

DCDJC040-I **NO DATA-NAMES INTO SORT**
Explanation: This program contains no figurative constants, special registers, CALLs, COPY members or literals referenced from the Procedure Division.
User Action: None.

DCDJCTA0-C DYNAMIC CALL TABLE EXCEEDED FOR CALL REPORT
Explanation: An internal Marble table is exceeded.
User Action: Contact Marble Computer, Inc.

DCDJE020-I NO DATA-NAMES INTO SORT
Explanation: No data names were passed out to the SORT. If the NOUNREF option was used, then unreferenced names were found to pass out to the SORT.
User Action: None.

DCDJE021-W NO DATA-NAMES WERE AVAILABLE FROM COBOL PROGRAM TO INCLUDE ON INTERNAL TABLE
Explanation: No data names were included on an internal table. If the NOUNREF option was used, then no referenced names were found.
User Action: None.

DCDJED02-E OVER 49 QUALIFIERS WERE FOUND FOR ONE USE OF A DATA NAME
& DCDJED03-E
& DCDJED04-E
& DCDJED05-E
Explanation: A data name with more than 49 qualifiers was found by DCD IV.
User Action: If this is a valid condition, contact MARBLE Computer, Inc.

DCDJG040-I NO DATA-NAME INTO SORT
Explanation: There were no references in the Procedure Division to data names in the Data Division.
User Action: None.

DCDJI040-I NO PARAGRAPH OR SECTION NAMES INTO SORT - IF (NOUNREF) USED, NO PARAGRAPHS WERE REFERENCED
Explanation: There were no references in the Procedure Division to paragraph or section names. If PARM option NOUNREF was used, then no paragraph names were referenced.
User Action: None.

DCDJPA34-E SR-SECT-RANGE-TABLE EXCEEDED IN NOPARAS PROGRAM
Explanation: An internal table was exceeded and needs to be fixed by Marble Computer, Inc.
User Action: Contact Marble Computer.

DCDJPX01-I **NO PARAGRAPH OR SECTION NAMES INTO SORT**
Explanation: No paragraphs or sections were found.
User Action: If a small program with none present, ignore message.

DCDKBS02-C **INDEXES EXCEEDED 125 FOR ONE OCCURS**
Explanation: DCD IV has a limit of 124 indexes present for 1 OCCURS. Documentation is lost.
User Action: Check the OCCURS to determine the cause of excessive use and ensure there are less than 125 indexes per OCCURS. If this is a valid condition, contact MARBLE Computer, Inc.

DCDKFA02-D **FILE EMPTY – NO MARBLE HEADER**
Explanation: The first record of a work file being read does not contain a MARBLE header record.
User Action: Look for possible previous messages to this one. Look for an error in the JCL used.

DCDKFB07-D **SELECTED MORE THAN 1000 ENTRIES – REDUCE SELECT**
Explanation: Over 1000 entries were SELECTED from the SELECT control statements entered.
User Action: Reduce the number of SELECTs used, and resubmit the run.

DCDKFBU1-E **TRACE TABLE (DIR-) EXCEEDED**
Explanation: An internal table, which holds detail from cumulative SELECTs, was exceeded.
User Action: Consider using less SELECTs or less ANDs and ORs in SELECTs.

DCDKFM02-D **FILE EMPTY - NO MARBLE HEADER**
Explanation: The first record of a work file being read does not contain a MARBLE header record.
User Action: Look for possible previous messages to this one. Look for an error in the JCL used.

DCDKFP06-E **OVER 9999 MATCHES - PROBABLE ERROR**
Explanation: With Trace Option, on one SELECT more than 9999 matches were found.
User Action: Look at SELECT and determine why this happened and fix.

DCDKFY1A-D **DDNAME (DCDWK09) MISSING**
Explanation: The DDNAME DCDWK09 is required by DCD IV for program DCDSYSTM.
User Action: Provide missing DDNAME. See JCL examples in User's Manual.

DCDKH040-D **FILE EMPTY - NO MARBLE HEADER**
Explanation: An internal work file was found to be empty.
User Action: Try rerunning.

DCDKH050-D **FILE EMPTY - NO DATA RECORDS**
Explanation: An internal work file was found to be empty.
User Action: Try rerunning.

DCDM5020-I **NO DATA-NAMES INTO SORT**
Explanation: No data names were found in the Data Division to be included on an internal table for building COBOL narrative from.
User Action: None.

DCDM5021-W **NO DATA-NAMES ON TABLE**
Explanation: No data names were found in the Data Division to be included on an internal table for building COBOL narrative from.
User Action: None.

DCDM5D02-C **OVER 49 QUALIFIERS WERE FOUND FOR ONE DATA NAME**
& DCDM5D03-C
& DCDM5D04-C
& DCDM5D05-C
Explanation: A data name with more than 49 qualifiers was found by DCD IV.
User Action: If this is a valid condition, contact MARBLE Computer, Inc.

DCDM5FA0-C **QUALIFICATION USED IN LINE #nnnnn IS NOT WITHIN 01 RECORD**
Explanation: A MOVE or other verb is using qualification and one data name is not within the 01 record.
User Action: Replace the data name not within the 01 record to a name within the 01 record.

DCDM5J01-W **THE NAME (reference-name) DOES NOT MATCH TO A DATA DIVISION NAME**
Explanation: A Procedure Division reference was made to a Data Division name that does not exist.
User Action: Check for a spelling error. If the name shown is a special register, notify MARBLE Computer, Inc. Then, ignore the message.

DCDM8U20-I **NO DATA NAMES INTO SORT**
Explanation: A program processing Indirect References had no data names to sort.
User Action: Similar to error message above, if program is small, ignore this error message.

DCDM9A02-I **NO INDIRECT REFERENCES IN PROGRAM WERE FOUND**
Explanation: No indirect references were found within the entire COBOL.
User Action: If program is small with very few references, ignore this error message.

DCDM9U20-I **NO DATA NAMES INTO SORT**
Explanation: A program processing Indirect References had no data names to sort.
User Action: Similar to error message above, if program is small, ignore this error message.

DCDMKB02-I **TABLE TOO SMALL - Contact MARBLE Computer**
Explanation: An internal table was exceeded for an exceptionally large program.
User Action: Contact Marble Computer.

DCDMN002-D **DDNAME (DCDWK07) MISSING**
Explanation: The running of DCD IV requires work files DCDWK07 and others. The DDNAME DCDWK07 was not found.
User Action: See JCL examples in the 'Alternate Compile Listing' section in the User's Manual and correct JCL.

DCDMUC02-W **FILE EMPTY - NO DATA OR PARAGRAPH RECORDS**
Explanation: An internal work file found no Data or Paragraph records for this COBOL program. This may be a valid condition for a very small program.
User Action: Check program and if very small ignore this message.

DCDMXJ01-E **INDIRECT TABLE FOR REPORT EXCEEDED**
Explanation: An internal table was exceeded.
User Action: Contact Marble Computer.

DCDNHD02-C & DCDNHD03-C & DCDNHD04-C & DCDNHD05-C **OVER 49 QUALIFIERS WERE FOUND FOR ONE DATA NAME**
Explanation: A data name with 49 qualifiers was found by DCD IV.
User Action: If this is a valid condition, contact MARBLE Computer, Inc.

DCDNHJ01-W **THE NAME (reference-name) DOES NOT MATCH TO A DATA DIVISION NAME**
Explanation: A Procedure Division reference was made to a Data Division name that does not exist.
User Action: Check for a spelling error. If the name shown is a special register, notify MARBLE Computer, Inc. Then, ignore the message.

DCDP1R10-E **EXCESSIVE SELECTIONS FOUND IN TRACING ALL POSSIBLE NAMES -TURN OFF YAP OPTION AND EXAMINE FIELDS SELECTED**
Explanation: Excessive SELECTions caused one or more internal tables to be exceeded.
User Action: Turn off TRACING option to get run to continue to end, then examine to see how SELECTs can be limited.

DCDP1SBA-E **RFP-TABLE NBR ENTRIES EXCEEDED – SELECT LESS ENTRIES OR CONTACT MARBLE COMPUTER**
Explanation: An internal SELECT table for Tracing & Analysis was exceeded.
User Action: Use less SELECTs in an attempt to have program run.

DCDP1Y70-I **NO DIRECT SELECTED NAMES WERE FOUND - TRACING FOR PROGRAM (progname) NOT DONE**
Explanation: An option was on indicating that TRACING should be done, however no names were selected.
User Action: Specify one or more names for SELECTION with SELECT statements.

DCDPBB03-E **BYPASS TABLE EXCEEDED –USE 1000 OR LESS BYPASS COMMANDS**
Explanation: Over 1000 BYPASS table entries were found.
User Action: Correct the number of BYPASS control statements to limit it to 1000 entries.

DCDPBG01-E **BYPASS TABLE EXCEEDED - USE 1000 OR LESS BYPASS COMMANDS**
Explanation: The number of BYPASS control statements must be limited to 1000.
User Action: Reduce the number of BYPASS control statements.

DCDPBG02-D **RANGE= REQUIRES nnnnn-nnnnn AND FOUND RANGE=XXXXXXXXXXXX**
Explanation: The RANGE control statement used is invalid.
User Action: Insure the RANGE=NNNNN-NNNNN format is used and resubmit.

DCDPBG03-E **BYPASS FILE – INVALID DATA NAME FOUND (xxxxxxx)**
Explanation: The first character of the name is a space.
User Action: Correct Bypass name and resubmit.

DCDPBG04-E **BYPASS NAME TABLE EXCEEDED -USE 1000 OR LESS BYPASS COMMANDS**
Explanation: The number of BYPASS control statements must be limited to 1000.
User Action: Reduce the number of BYPASS control statements.

DCDPBH01-W **THE BYPASS CONTROL STATEMENT (user-name) WAS NOT FOUND IN THIS PROGRAM**
Explanation: The user-data-name was either misspelled or not found within the COBOL program.
User Action: If name was expected to be found, correct spelling or determine why name is missing. If not all names were expected to be found, optionally use NODNB option to turn these warning messages off.

DCDPEY30-D **MARBLE HEADER MISSING - CONTACT MARBLE COMPUTER**
Explanation: A header is missing on an internal work file.
User Action: If this message occurs more than once and rerunning does not eliminate, contact Marble Computer.

DCDPEY40-D **NO PROGRAM HEADER FOUND FOR PROGRAM (progname)**
Explanation: A header is missing on internal work file 09.
User Action: If this message occurs more than once and rerunning does not eliminate, contact Marble Computer.

DCDPEY60-E & DCDPEY90-E **TOTAL TRACE ENTRIES EXCEED nnnnn MAX ENTRIES FOR TABLE FOR PROGRAM progname - SELECT LESS ENTRIES**
Explanation: Too many entries were SELECTed by the SELECT control statements and a table was exceeded.
User Action: Redo the SELECTs used and resubmit to select less entries.

DCDPF040-D **MARBLE HEADER MISSING - CONTACT MARBLE COMPUTER**
Explanation: A header is missing on an internal work file.
User Action: If this message occurs more than once and rerunning does not eliminate, contact Marble Computer.

DCDPF055-D **NO PROGRAM HEADER FOUND FOR PROGRAM (progname)**
Explanation: A header is missing on internal work file.
User Action: If this message occurs more than once and rerunning does not eliminate, contact Marble Computer.

DCDPFC02-E **TOTAL TRACE ENTRIES EXCEEDS nnnnn MAX ENTRIES FOR TABLE FOR PROGRAM progname**
Explanation: All entries either directly selected for TRA entries or added through TRACING exceeds the maximum number available in table space.
User Action: Select less entries so the amount of table space is reduced.

DCDPFC03-D **DIRECT ENTRY MISSING FROM INTERNAL TABLE - CONTACT MARBLE COMPUTER**
Explanation: This may be an internal logic error.
User Action: Try rerunning, then if this message still appears, contact Marble Computer.

DCDPNP05-W **UNABLE TO GUAGE CORRECT USE OF FLOATING POINT COMP-1 OR COMP-2 - USER MUST CHECK CAREFULLY**
Explanation: During Tracing and Analysis that follows data fields from one field to another via From-To positions with an 01 record, a field is being traced through Floating point fields where From-To positions may not be accurately followed.
User Action: User should look at results carefully and not rely entirely on results given.

DCDPNP06-W **FIELD WITH (xxxxxx) USAGE AT CMPLR NBR nnnnn HAS DIFFERENT LENGTH FROM FIELD WITH SAME USAGE AT CMPLR NBR nnnnn**
Explanation: During Tracing and Analysis that tracing using From-To positions are linking two fields with different lengths together. Our processing will follow only From-To positions from original field through new field.
User Action: This is a warning for user clarification. No further action required except to notice difference, unless user wants to make program changes to rectify length difference.

DCDPNP08-W **BINARY FIELD AT CMPLR NBR nnnnn IS NOT A HALFWORD, FULLWORD, OR DOUBLEWORD**

Explanation: A binary (BINARY or COMPUTATIONAL) field is found where the real calculated positions for the field in question is outside the normal length of 2, 4, or 8 bytes for a halfword, fullword, or doubleword.
User Action: User should look at usage and make any change deemed necessary or ignore this message.

DCDPNP09-W BINARY FIELD AT CMPLR NBR nnnnn IS TOO SMALL FOR FIELD AT CMPLR nnnnn
Explanation: Within Tracing and Analysis, the binary field being traced into, is too small for the record positions of the other field.
User Action: This is a warning only, however the user may want to analysis why this is happening.

DCDPNP0A-W BINARY FIELD AT CMPLR NBR nnnnn IS TOO LARGE FOR FIELD AT CMPLR nnnnn
Explanation: Within Tracing and Analysis, the binary field being traced into, is too large for the record positions of the other field.
User Action: This is a warning only, however the user may want to analysis why this is happening.

DCDPNP0B-W FIELD AT CMPLR NBR IS NOT EXACT SIZE AS FIELD AT CMPLR nnnnn
Explanation: During Tracing and Analysis that follows data fields from one field to another via From-To positions with an 01 record, a field is being traced through Binary fields where From-To positions may not be accurately followed.
User Action: This is a warning only, however the user may want to analysis why this is happening.

DCDPNY80-E NSD – TABLE EXCEEDED - REDO SELECT STMTS TO SELECT LESS DATA NAMES
Explanation: An internal table was exceeded.
User Action: Reduce the number of SELECTs to select less data names so internal table will be reduced in size.

DCDPQC06-I TRACING IGNORED AS THE FLAG POSITIONS WERE FOUND OUTSIDE THE MOVE OR COMPARE
Explanation: A PROCEDURE DIVISION instruction was found with a field that should be traced; however, the field, when being moved or compared, was truncated due to the size of the other field, and tracing is being ignored.
User Action: No action is necessary.

DCDPQU30-D FILE EMPTY - NO MARBLE HEADER
Explanation: An internal work file was found to be empty.
User Action: Try rerunning. If necessary, contact Marble Computer.

DCDPQUA0-E INTERNAL TABLE (RFC-) EXCEEDED - CONTACT MARBLE COMPUTER
Explanation: An internal table was exceeded.
User Action: Reduce the number of SELECTs to select less data names so internal table will be reduced in size.

DCDPTP06-E INTERNAL DATA NAME TABLE EXCEEDED - CONTACT MARBLE COMPUTER
Explanation: An internal data name table was exceeded.
User Action: Look at the SELECTs statement used and reduce them to reduce table space.

DCDPTP07-E OVER 9999 MATCHES - PROBABLE ERROR
Explanation: Tracing included over 9999 matches.
User Action: Look at the SELECTs statements used and change or reduce the number used to correct this error.

DCDPTP08-D DATA-NAME TABLE EXCEEDED - RUN WITH SMALLER NBR OF CONTROL STATEMENTS OR TURN OFF OPTION (YAP)
Explanation: An internal tracing table was exceeded. This is probably due to an excessive number of SELECTs being used.
User Action**:** Reduce the number of SELECTs or turn off the Tracing Option.

DCDPTY10-D DDNAME (DCDWK09) MISSING
Explanation: A DD statement is missing.
User Action: Inspect the JCL and add the DD statement.

DCDPTY50-D FILE EMPTY - NO MARBLE HEADER
Explanation: An internal work file was found to be empty.
User Action: Try rerunning.

DCDPTY60-D EXCEEDED INTERNAL TABLE - USE LESS CONTROL STATEMENTS
Explanation: An internal table was exceeded.
User Action: Look at the SELECTs statement used and reduce them to reduce table space.

DCDT0080-C NARRATIVE ONLY ALLOWED FOR ONE PROGRAM AT A TIME
Explanation: Narrative will only allow one program at a time for Layout Reports.

User Action: DCD IV will print narrative alongside the first program.

DCDTB015-I **COBOL SORT CALLED FOR PROGRAM (XXXXXXXX) DUE TO INSUFFICIENT GETMAIN SPACE**
Explanation: The size of the COBOL program was larger than the table space necessary to do an internal shell sort, so the COBOL sort was called.
User Action: None.

DCDTBC02-D **FILE EMPTY - NO MARBLE HEADER**
Explanation: The first record of a work file being read does not contain a MARBLE header record.
User Action: Look for possible previous message to this one. Look for an error in the JCL used.

DCDTDC18-E **TABLE LIMITS EXCEEDED REGION**
Explanation: An internal table was not large enough to handle the program run through DCD IV.
User Action: Rerun the job with a larger region.

DCDUBB01 -D **THE NBR OF RECORDS SELECTED BY SRA CTL CARDS EXCEEDS 775**
Explanation: Too many control cards were used for DD CTLCDSRA.
User Action: Use less control statements.

DCDUD020 -I **NO DATA-NAME INTO SORT**
Explanation: There were no references in the Procedure Division to data names in the Data Division.
User Action: None.

DCDUDA02 -W **EARLY EOF ON INFO-FILE-2**
Explanation: An early end of file was found on an internal work file.
User Action: Check results to see if everything is correct. If in doubt, contact MARBLE Computer, Inc.

DCDUDA11-E & DCDUDA13-E **TABLE LIMITS EXCEEDED REGION**
Explanation: An internal table was not large enough to handle the program run through DCD IV.
User Action: Rerun the job with a larger region.

DCDUFB05-E **TABLE LIMITS EXCEEDED REGION**
Explanation: An internal table was not large enough to handle the program being documented.
User Action: Rerun the job with a larger region.

DCDUHB05-E **TABLE LIMITS EXCEEDED REGION**
Explanation: An internal table was not large enough to handle the program being documented.
User Action: Rerun the job with a larger region.

DCDV3050-I **COBOL MEMBER (program name) NOT FOUND**
Explanation: COBOL program name was not found. This occurs when using PARM option READPDS.
User Action: Check to ensure program name is correctly spelled and is there.

DCDV3051-D **DDNAME (DCDREPDS) MISSING**
Explanation: In the JCL, the DDNAME for DCDREPDS is missing.
User Action: Check in the JCL to ensure the DDNAME is there and correctly placed.

DCDV3052-D **COBOL MEMBER (program name) NOT FOUND**
Explanation: COBOL program name was not found. This occurs when using PARM option READPDS.
User Action: Check to ensure program name is correctly spelled and is there.

DCDV3053-D **COPY MEMBER NOT FOUND IN COPYLIB SPECIFIED**
Explanation: When DCD IV attempted to read the COPY member in the COBOL program, it was not found in the partitioned data set specified by DSN= in the COPYLIB DD.
User Action: Check the COPY member name to ensure it is valid and that the correct PDS file specified within the DSN= in the COPYLIB DD.

DCDV3054-D **NO RECORDS FOUND IN MEMBER (copy member name)**
Explanation: When DCD IV attempted to resolve this COPY member, it found no records in the member.
User Action: Check the COPY member and make corrections as necessary.

DCDV3A02-I **WORK FILES FOR PROGRAM (XXXXXXXX) DID NOT HAVE OPTION (XXX) IN LAST (WRITPDS) RUN**

Explanation: When the READPDS option is used, all files on the data set referenced with the DDNAME of DCDREPDS must have been created with all the same PARM options, which are used in this run using the READPDS option. These work files did not have those options turned on and are being bypassed.
User Action: Ignore these messages or re-create the DCDPDS files using the WRITPDS option along with the option shown in the message.

DCDV3A03-E WORK FILE FOR PROGRAM (XXXXXXXX) IS INCOMPLETE FOR OPTION (XXX) - THIS OPTION IS BEING TURNED OFF
Explanation: See explanation for message DCDV3A02-I. Multiple options for reports were used during this READPDS run and not all the options correspond to what was used during the WRITPDS run. This option is being turned off.
User Action: Review process, rethink and possibly re-create DCDPDS file.

DCDVA020-D DDNAME (DCDPDS) MISSING
Explanation: In the JCL, the card for DCDPDS is missing.
User Action: Check the JCL to ensure the DD card for DCDPDS exists and is correctly placed.

DCDMWU20-W NO DATA-NAMES INTO SORT
Explanation: This program contains no sequence numbers of names referenced from the Procedure Division.
User Action: None.

DCDMWU21-W NO DATA-NAMES ON TABLE
Explanation: This program contains no sequence numbers of names referenced from the Procedure Division.
User Action: If this is a small program, none, otherwise investigate why no sequence numbers were picked up.

DCDX1050-I NO RECORDS WERE PASSED INTO THE SORT FOR THE JCL PROC ANALYSIS REPORT
Explanation: Either no DDNAMEs were found or the entire JCL is missing.
User Action: Check to see what JCL was used and examine.

DCDX1A04-C OVER 500 EXCLUDE DDNAMES WERE USED-THE REMAINING EXCLUDE DDNAMES ARE IGNORED
Explanation: Too many control cards were used.
User Action: Reduce the number of control statements.

DCDX1FR0-C EXCESSIVE REFERBACKS (OVER 500) WERE USED IN ONE PROC - THOSE OVER LIMIT ARE IGNORED
Explanation: More referbacks were present in one PROC than this software can handle.
User Action: Find out why excessive referbacks were used and see if this number can be reduced. If this is a valid condition, contact Marble Computer.

DCDX1FS0-C EXCESSIVE SYMBOLICS (OVER 2000) WERE USED IN ONE PROC - THOSE OVER LIMIT ARE IGNORED
Explanation: More symbolics were present in one PROC than this software can handle.
User Action: Find out why excessive symbolics were used and see if this number can be reduced.

DCDX1QA0-W TABLE EXCEEDED - ONLY THE FIRST (nnnnn) PROC NAMES WILL BE SHOWN IN THE LIST OF PROC NAMES
Explanation: A table used to hold PROC names for later printing out the names of PROCs used has been exceeded.
User Action: The main report used to report on the JCL is accurate. The sub-report used to show which PROCs were inputted will be truncated.

DCDX2050-I NO RECORDS WERE PASSED INTO THE SORT FOR THE JCLLIB ANALYSIS REPORT
Explanation: Insufficient JCL was found or the entire JCL is missing.
User Action: Check to see what JCL was used.

DCDYA030-I NO DATA-NAMES INTO SORT
& DCDYB030-I
& DCDYC040-I
& DCDYE030-I
Explanation: For VERB, RECORDS, SRA, or COPY report respectively, no data names were found or sorted. This indicates no entries were found to be reported on for the report selected.
User Action: No required action.

DCDYG040-I NO DATA NAMES INTO SORT
Explanation: There were no records passed in to the CALL Report.
User Action: None.

DCDYH050-I NO RECORDS WERE PASSED INTO THE SORT FOR THE CALL HIERARCHY REPORT

Explanation: No records were passed out to the SORT.
User Action: None.

DCDYH060-D **UNABLE TO DETERMINE ONE MAIN PROGRAM - SEE PRIOR MESSAGES - UNABLE TO PRODUCE REPORT**
Explanation: When determining the order of hierarchy for the CALL Hierarchy Report, a program was called in a fashion that makes it impossible to complete the hierarchy. For example, program A calls program B, which calls program C, which then calls program A.
User Action: Determine why this is happening and either correct or do not run this report.

DCDYHD17-W **OVER nnnn DIFFERENT CALLS FOUND IN PROGRAM (xxxxxxxx) – EXCESS IGNORED**
Explanation: More CALLs were found in one program than can be handled.
User Action: Determine why excess CALLs are used. Possibly try using a DELETE control card to reduce this number.

DCDYHD30-C **THE HIERARCHY EXCEEDED 23 LEVELS DEEP FOR SYSTEM (xxxxxxxx) - EXCESS LEVELS IGNORED**
Explanation: The CALL Hierarchy Report is designed to handle CALLs to a level of 23 deep. CALLs going deeper than that are ignored.
User Action: Determine why CALLs are going to this depth. If necessary, contact MARBLE Compute, Inc.

DCDYHD31-E **CANNOT ADD CALL TO (xxxxxxxx) AS THIS IS WITHIN CURRENT STRING - SEE NOTE BELOW**
Explanation: When determining the trace of CALLs, a CALL to a program was found that itself is found earlier within this chain.
User Action: See following messages which show the order of the trace established so far. Then determine why this is happening and either correct or do not run this report.

DCDYHD80-I **xxxxxxxx xxxxxxxx xxxxxxxx**
Explanation: This message appears after message DCDYHD31-E, showing the order of CALLs which caused that message. If necessary, more than one of these messages will appear.
User Action: See error message DCDYHD31-E.

DCDYHFA0-E **EXCEEDED nnnn PROGRAMS FOR CALL HIERARCHY CHART - WILL BE INCOMPLETE**
Explanation: The number specified is the maximum number of programs that may be submitted for this report.
User Action: Determine if a smaller number of programs may be used when running this report.

DCDYG040-I **NO RECORDS WERE PASSED INTO THE SORT FOR THE CALL ANALYSIS REPORT**
Explanation: No selected records were found to report on for CALL Analysis Report.
User Action: Determine if CALLs were not present, then ignore this message.

DCDYIA04-E **CONTROL CARDS FOR CTLCAHCC MUST BEGIN WITH (ADD) OR (DELETE)**
Explanation: Control cards for the CALL Hierarchy Report begin with either ADD or DELETE.
User Action: Correct the control statement in error and resubmit.

DCDYIA06-E **FIRST PROGRAM NAME MUST BE ALPHANUMERIC FIELD FROM 1 TO 30 CHARACTERS LONG – BYPASSING**
Explanation: The program name used in a control statement exceeded 30 characters in length.
User Action: Enter a correct program name and resubmit.

DCDYIA08-E **THE THIRD FIELD ON CTLCAHCC CONTROL CARDS MUST BE THE CONSTANT (CALLS) – BYPASSING**
Explanation: The third field on control cards when used must be the constant (CALLS).
User Action: Determine what format was desired for this control card, correct and resubmit.

DCDYIA10-E **SECOND PROGRAM NAME MUST BE ALPHANUMERIC FIELD FROM 1 TO 30 CHARACTERS LONG – BYPASSING**
Explanation: Any program name used in a control card must not exceed 30 characters in length.
User Action: Enter a Correct program name within control statement and resubmit.

DCDYIA11-E **MORE CONTROL CARDS WERE SPECIFIED THAN PERMITTED – REDUCE NUMBER OF CTL CARDS**
Explanation: More than 500 control statements were submitted for the CALL Hierarchy Report.
User Action: Use less control statements.

DCDYIE01-E **AN EXPECTED FIELD WITHIN A CONTROL CARD IS MISSING**
Explanation: The format of the control statement requires one more field and this field is missing.
User Action: Determine the correct format and resubmit with the correct control card.

DCDYK040-I **NO DATA-NAME INTO SORT**
Explanation: There were no records passed into the PARAGRAPH Report
User Action: None.

DCDYL030-I **NO DATA NAMES INTO SORT**
Explanation: There were no records passed out to the DATA Report.
User Action: None.

DCDYN100-I **NO RECORDS WERE PASSED INTO SORT FOR THE TRACING AND ANALYSIS REPORT & DCDYN110-I**
Explanation: No records were passed to an internal sort. This is an informational message.
User Action: It may be that no records were selected, which will cause this message. Check SELECT statements used.

DCDYN115-I **NO RECORDS WERE SELECTED FOR PRODUCING TRACING & ANALYSIS REPORT**
Explanation: The SELECTs used did not find any matches within this program.
User Action: If processing only one program, insure the correct SELECT is used.

DCDYNA01-D **MISSING HEADER RECORD FOR DCDWK09 IN PROGRAM DCDTARPT**
Explanation: An internal header record is missing from the internal file name shown.
User Action: Try resubmitting run.

DCDYNB11-E **OVER 250 SELECTIONS FOUND WITHIN RECORD (record-name)**
Explanation: Within one record, more than 250 fields were selected.
User Action: Go back and change the SELECTs used to select less fields. Be more specific in selecting fields.

DCDYPB01-C **INVALID FIELD FOUND - BYPASSING**
Explanation: A field on an internal work file has a field which should be numeric but is not.
User Action: If this happens continuously, contact MARBLE Computer.

DCDYPB02-D **MATCHING SOURCE LINE NOT FOUND - RUN ENDING**
Explanation: Internal work files for doing code changing require a source code work file and this file is missing.
User Action: Possible logic error. Try resubmitting.

DCDYPE03-D **INTERNAL TABLE EXCEEDED - CONTACT MARBLE COMPUTER**
Explanation: An internal table was exceeded.
User Action: Contact Marble Computer.

DCDYT030-I **NO DATA-NAMES INTO SORT**
Explanation: There were no records passed into the PARAGRAPH Report
User Action: None.

DCDYU030-I **NO DATA-NAMES INTO SORT**
Explanation: There were no records passed into the PARAGRAPH RANGE Report
User Action: None.

DCDYWG04-E **RECORD LOCATIONS ARE OFF**
Explanation: Record locations are off due to incorrect use of an (*) within the control statements.
User Action: Check the JCL control statements to ensure it is the correct logic.

DCDYY030-I **NO DATA-NAMES INTO SORT**
Explanation: There were no records passed in to the LAYOUT Report.
User Action: None.

DCDZZ099-D **See SYSOUT for MISSING DD or other error**
Explanation: An error has occurred in one of Marble's work files DCDWK01 through DCDWK12
User Action: To see more information on this error, look at messages near the end of the SYSOUT DD.

Release 4.0

DCD IV

Installation Guide

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DCD IV
Installation Guide

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Introduction

This installation guide corresponds to release **4.0** of the Data Correlation and Documentation System (DCD IV).

With Release 4.0, besides installing **DCD IV**, the installation of PC software **CAT-ACL** must be done. Installation of either of these software packages for release 4.0 requires that you contact Marble Computer for the appropriate USB thumbnail drives loaded with software. Our web site for contacting us is: www.marblecomputer.com.

This new PC software allows the programmer/technician to automatically download the 'Alternate Compile Listing' report after running on the mainframe and then access that software on the PC.

> *It should be noted that many of the modifications incorporated into this release are the direct result of user request. An example of this is the ISPF Panels added with release 1.5 or the new Tracing & Analysis Report feature added with release 2.4 or the addition of Indirect References with release 3.1 and the Unused Data Names and Unused Paragraph reports in release 3.4 and* ***CAT-acl with release 4.0****. Modifications to support additional user requests are currently under development for future releases. It is our policy to provide requested features where such support is technically and economically feasible.*

---NOTICE---

Installation of this release of DCD IV requires DCDCNTRL control file information for your site that is available from a prior release. Look at DCDCNTRL DD in previous JCL. This may also be obtained from Marble on a special green colored Installation "- Addendum 3 -" page.

*For Trial users, Addendum 3 is a **Pink** colored page that is provided from Marble.

If you have any problems, suggestions or comments, please contact MARBLE Computer, Inc. at 1-800-252-1400.

Overview of steps for installing DCD IV

Step 1 - Obtain all 8 DCD IV files in the USB drive from Marble then skip **Step 1** on the next page.

Steps 2, 3, & 4 - Complete Testing of DCD IV without SPF panels uses the first two DCD IV files.

Steps 5 & 6 - Install and test CAT-ACL.

Step 7 - Use of the last 6 files to Install ISPF panels for running of DCD IV through ISPF panels.*

*The use of our SPF panels is NOT recommended for use in DCD IV in Compile Mode and may not be used in creating the one file for downloading 'Alternate Compile Facility' to the PC.

Step 1 – Electronic Downloading of DCD IV Files

Electronic downloading may not be used with release 4.0. The software for DCD IV release 4.0 is provided on a USB thumb nail drive along with CAT-ACL software. With this USB drive go to Step 2.

DCD IV is available for downloading by contacting Marble Computer for software for DCD IV and for CAT-ACL that after obtaining, is loaded on the PC and then uploaded to the mainframe from there. Complete instructions uploading to user's mainframe from the PC are provided within a download on a ReadMe.Txt file on the software obtained. To contact us for this software, go to Marble web site, www.marblecomputer.com and look for a download link for DCD IV or CAT-ACL and click on that link or call us at 1-800-252-1400.

Continue with Step 2 on the next page after obtaining the new DCD IV files.

Step 2 - Modifying DCD IV PROCs

A list of all the members on the DCD IV CNTL file are listed under the heading, "**DCD IV JCL Procedure Library**", in this section.

The following are PROCs, which require modification:

1. COMACL for executing the Alternate Compile Listing Facility in Compile Mode.
2. DCDACL for executing the Alternate Compile Listing Facility in Independent Mode.
3. LIBACL for executing the Alternate Compile Listing Facility if Librarian is used in your shop.
4. PANACL for executing the Alternate Compile Listing Facility if Panvalet is used in your shop.
5. DCDCOBOL for executing the Other COBOL Reports Facility on one or more COBOL programs.
6. LIBCOBOL for executing the Other COBOL Reports Facility on one or more COBOL Programs if Librarian is used in your shop.
7. PANCOBOL for executing the Other COBOL Reports Facility on one or more COBOL programs if Panvalet is used in your shop.
8. MBRFETCH for selecting members from a partitioned data set to produce reports from the Other COBOL Reports Facility.
9. DCDJCL for executing the JCL PROC Analysis Reports Facility.

These PROCs are listed in this manual in their appropriate section (i.e. - Alternate Compile Listing, Tracing & Analysis and Other COBOL Reports or JCL PROC Analysis). See the next page for necessary modification of selected PROCs for your installation.

After selecting the PROCs which will be used in your shop, go into each of the PROCs individually and:

1) Insert STEPLIBs where noted to point to the load library where the DCD IV, Panvalet or Librarian modules reside.

2) If known COPY member libraries are used in your shop, insert COPYLIB DDs where noted to point to these COPY libraries. These should match to what is used in the SYSLIB step of your installations COBOL compile PROCs.

3) If SYS1.SORTLIB is not the standard library for sort routines in your shop, modify as appropriate.

4) Modify the (//CONTROL DD) line to the appropriate CONTROL data set (see the Installation Addendum and/or see – "**Step 3 - Creating a Control Record**").

5) At the beginning of each PROC make appropriate changes to symbolic parameters that are present on the last six to eight lines. The symbolic parameters before this point should generally be left as they are.

   The following symbolic parameters in all PROCs affect DCD IV resource utilization:

SYMBOLIC	DEFAULT	MINIMUM	MEANING
REG	varies	varies	REGION SIZE
BUF	5	2	DCB BUFNO
SORTREG	600000	600000	SORT REGION

Decreasing these values increases run time, while decreasing PAGE and/or storage requirements. Do not increase SORTREG above 1,000,000 and do not increase BUF above 9.

For installations concerned about storage resources, the minimum REGION required to generate DCD IV reports is 4096K for the Alternate Compile Listing Facility and 6144K for all other DCD IV reports. If using this minimum, the BUF and SORTREG parameters must be set to "2" and "600000", as indicated above. **Using too small a region may cause an OC4.**

When the PROCs are modified and tested, they should be stored on a system PROCEDURE library for general use.

6) Consider removing the SORT work files (SORTWK01-03) and SORTLIB from those PROCs which use them. Many SORT packages do dynamic allocations of these files. When this is done, they are not needed within our PROCs.

Step 3 - Creating a Control Record

To create a control record, set up one 80-character record as a member named DCDCNTRL, on a permanent JCL or control statement partitioned data set. The LRECL on the PDS must be 80. Fill in only the first thirteen characters on this control record from installation addendum or from previous installation. Leave columns 14 through 80 blank.

For trial users, see the provided Installation Addendum to obtain the date and related control characters for this control record. **(For existing users, go to the dataset or control information used in prior DCD releases within the DCD step by looking at the //CONTROL DD file.)**

If this is a new installation and the Installation Addendum is not found, or for some reason the previous //CONTROL DD file information is not found, contact MARBLE Computer, Inc., at 1-800-252-1400 for this control information.

Step 4 - Testing DCD IV

At a minimum, adequate testing should include the COMACL, DCDACL, DCDCOBOL and DCDJCL PROCs. If Librarian or Panvalet is used, then the PROCs LIBACL and LIBCOBOL or PANACL and PANCOBOL should also be tested. To test DCD IV, do the following:

1) Modifying the member DCDCNTRL on the file DCD IV.CNTL just loaded with the one line control statement information provided in the Installation Addendum (this must be done first). **For existing users, see the DCDCNTRL file used in a prior release.**

2) Pull in the member TDCDACL from the CNTL PDS file unloaded from the cartridge. This contains JCL to test the Independent Mode PROC DCDACL. Modify the JOB statement and modify the DSNs to point to the two PDSs just unloaded from the tape. Submit the job and check the results for COND CODE of 0000.

3) Pull in the member TCOMACL from the file used above. Modify the JOB statement and DSNs as above. As necessary, change the COBUC PROC name if this is not a standard PROC for doing a COBOL compile at your installation. Submit the job and check the results for the following COND CODEs:

1.	COB	0000	
2.	DCD	**0001**	
3.	RETCMPLR	*	NOT EXECUTED

4) Pull in the member TDCDCOBO from the file used above. This contains JCL to test the other reports produced through DCD IV. Modify the JOB statement and modify the DSNs to point to the two PDSs just loaded from the tape. Submit the job and check the results for a COND CODE of 0000.

5) Pull in the member TDCDJCL from the CNTL PDS file loaded from the cartridge. Modify the JOB statement and modify the DSNs to point to the two PDSs just loaded from the cartridge. Submit the job and look for a COND CODE of zeros in both steps.

6) If Librarian or Panvalet are used, refer to Examples 2 and 3 under the Alternate Compile Listing Facility section and at Examples 1 and 2 under the Other COBOL Reports Facility section in this manual for suggested JCL to test these PROCs. Look for a COND CODE of 0000 from the DCD step.

7) See Example 4 under the Tracing & Analysis and Other COBOL Reports Facility section for suggested JCL to test the MBRFETCH PROC.

Step 5 – Downloading and Testing CAT-ACL

CAT-ACL is a PC package that is part of **DCD IV** and interfaces with DCD IV for allowing PC analysis of mainframe software after running through DCD IV.

Downloading

In release 4.0 of DCD IV, CAT-ACL is provided on the same USB drive that holds DCD IV. Directions for installing are on a file 'CAT-ACL Installation.doc' on that drive. If not available, call us at 1-800-252-1400 to obtain this USB drive.

Testing (also see user pages A-20 thru A-22 of this User's Manual that match information in **Step 6** below)

Using the following instructions, create a data file on the mainframe after running DCD to download to the PC and then use FTP to download either directly to a network storage location, or to the PC and then invoke CAT-ACL software to test:

1. Set up two catalogued files that are needed for using FTP to download a mainframe file to the PC. (See '**First Time JCL**' in Step 6)
2. Set up JCL, starting with member TDCDACL provided on install file DCDIV.CNTL, and add four lines of JCL as shown under 'Sample Directive..' in Step 6 for executing FTP.
3. This job stream will now create a mainframe DCD IV file and download this file via FTP to an internal network storage location or directly to the PC. Run this JCL to create the needed file on the server or PC.
4. Bring up CAT-ACL software on the PC. If the file downloaded from the mainframe was downloaded to the correct directory, the file will immediately show within CAT-ACL.

Step 6 – Establish a CAT-ACL procedure for internal users

After downloading and testing the interface between DCD IV on the mainframe and CAT-ACL on the PC, it is necessary to create an in-house directive or internal MEMO conforming with existing standards to:

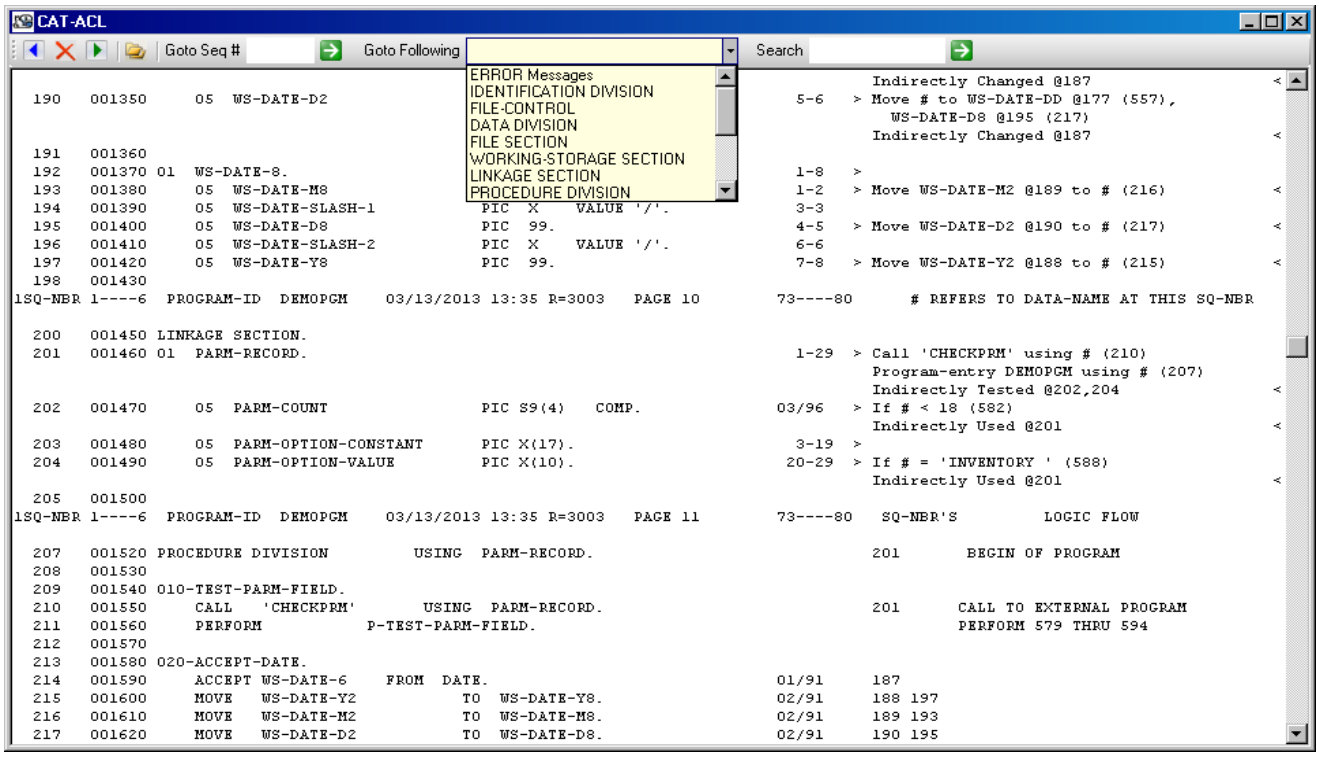
1) Notify internal users that CAT-ACL* is available and direct them to our web site or provide other information similar to that shown here and on pages A-20 through A-22 of this manual
2) Direct users how to download CAT-ACL using FTP
3) Consider including following headings 'First Time JCL' and 'Entering FTP Commands' in building the directive for users accessing CAT-ACL software

See the next page for creating a sample directive that needs installer modification to conform to internal standards for using FTP and / or downloading a mainframe file to the PC.

*CAT-ACL is available for 'Alternate Compile Listing' runs through any one of the following installed PROCs (DCDACL, COMACL, PANACL, and LIBACL).

Sample Directive for internal users using CAT-ACL

The 'Alternate Compile Listing' in DCD IV (formerly DCD III) is now available for viewing on the PC with special software CAT-ACL for viewing with greater PC flexibility as shown below:



The internal procedure for downloading CAT-ACL from the Marble Web Site to your PC is as follows:

To FTP the 'Alternate Compile Listing' file to the PC after running internal PROC (COMACL, DCDACL, LIBACL, or PANACL) on the mainframe, extra JCL as shown here must be appended at the end of the DCD step as follows:

```
//DCD.PCTEMPFL DD DSN=userid.FILE2PC,DISP=SHR
//FTP2PC  EXEC  PGM=FTP,PARM='(EXIT=8',REGION=2048K
//OUTPUT   DD    SYSOUT=*
//INPUT    DD    DSN=userid.FTPSTMTS,DISP=SHR
```

Note - Substitute **userid** in JCL above with your userid in two places. As userid will vary for each individual user, a procedure must be in place to accomplish this or the user must be guided otherwise in how to do specify his / her unique **userid** in this DD.

Two files, both using DSN=userid. in JCL above must be created for each individual user on the mainframe. Instructions for creating these two files under one individual userid are shown here starting on the next page and in the 'Alternate Compile Listing Facility' section of this manual under the heading name, **First Time JCL**.

First Time JCL (to create files FILE2PC and FTPSTMTS)

File FILE2PC

File userid.FILE2PC is used to hold the special 'Alternate Compile Listing' to PC file in a catalogued data set so that is can be downloaded by FTP to the PC. Once this data set is catalogued one time on an individual's userid, everything is set for continued use.

Go to the 'Data Set Utility', e.g. =3.2 within ISPF, and Allocate and Catalog a file name in the format 'userid.FILE2PC' where userid is replaced with the user's userid.

When allocating the file, use the following attributes:

Volume serial	= (`fill in`)
Space units	= CYLINDER
Primary quantity	= 1
Secondary quantity	= 2
Directory Blocks	= 0 (for sequential data set)
Record format	= FB
Record Length	= 133
Block Size	= 13300

Insure the file is catalogued when done.

File FTPSTMTS

File userid.FTPSTMTS is used to hold FTP control statements for correctly transferring the COBOL mainframe file to the PC. Once the data set is allocated, catalogued and then control statements are entered to direct FTP, the file should rarely need modification.

Go to the 'Data Set Utility', e.g. =3.2 within ISPF, and Allocate and Catalog a file name in the format 'userid.FTPSTMTS' where userid is replaced with the user's userid.

When allocating the file, use the following attributes:

Volume serial	= (`fill in`)
Space units	= TRACK
Primary quantity	= 1
Secondary quantity	= 1
Directory Blocks	= 0 (for sequential data set)
Record format	= FB
Record Length	= 80
Block Size	= 800

Insure the file is catalogued when done.

See **Entering FTP Commands** on the next page.

Entering FTP Commands

Now that the file is catalogued, go into the edit panel (e.g. =2), with the specified file name, and enter appropriate FTP commands to allow FTP to succeed in transferring the COBOL file to the PC.

Before entering control statements, enter the **'NUMBER OFF'** command on the editor command line and hit enter.* After this is done enter five lines as follows:

```
nnn.nnn.nnn.nnn          (Enter IP address here)
userid password          (Enter userid and password with one space between them)
CD ./PCDCDC/TRANSFER/IN
PUT 'userid.FILE2PC' File2PC.txt
QUIT
```

If you do not have an ***IP address*** or if there are in-house policies or directions on using FTP, consult either in-house memo's or get directions from the person responsible for using FTP in-house.

After entering commands, do the following:

1. Do an initial SAVE before proofing. The reason for initial SAVE is explained just below.
2. Insure there are blanks at the end of each line all the way through column 80 by using the F11 function key. Warning- Sometimes hitting the wrong function will exit from editor without saving entered commands, hence the need above for an initial SAVE.
3. If there are line numbers in columns 73-80, again make sure NUMBER OFF is in effect and then wipe out columns 73-80 in the editor replacing them with spaces.
4. Save file and check one more time with F11 to insure nothing is in columns 73-80.

WARNING on columns 73-80

*FTP does not work if there are numbers embedded in columns 73-80 of the control file and when control statements are entered without NUMBER OFF being specified, these numbers **are not** viewed by the user unless Function F11 is used to be able to see them. Then when running FTP, if they are present, FTP fails to run **without** specifying a clean message as to why and the user may waste a large amount of time determining why. This may result in an hour or two of wasted time in determining why.*

For this reason, along with others, control statements are entered in a separate file. By placing these statements within a separate file that are not often modified, and this reduces the chance of user error in daily use of her or his JCL used to execute DCD.

Downloading CAT-ACL

Contact the department in your company responsible for maintaining PC software for the most recent CAT-ACL software or visit the Marble web site at: www. marblecomputer.com.

If the software CAT-ACL is loaded to a company server, the user will need in-house advice on how to access. If the software is loaded to the PC and it is not already done, the user will need help in loading CAT-ACL software.

Step 7 - Installing and Testing ISPF Panels

General Notes

Naming conventions:

1. All DCD IV ISPF panels begin with the letters DZ3.
2. Several user PROFILE names are built and kept after execution of DCD IV ISPF panels. Each of these profile names begin with the letters DZ3 followed by the letter A, B, C, D, H, J, or 1.
3. The CLIST member DZ3DCD1 assigns an application-id of $DCD to these names.

Variable Blocked CLIST file:

The CLIST file copied from the cartridge in step 4 of the JCL shown on page F-8, is a variable blocked file. If CLISTs are fixed block at your installation, then a new CLIST file should be allocated and catalogued as fixed block and the file loaded from the cartridge should be copied to this new file. The variable blocks CLIST file should be deleted.

Modifying members on three of the files:

Before these members can be used, changes need to be made to some CLIST, Panels and JCL members. These changes are covered in the next two headings:

1. Modifying necessary CLISTs, Panels, and JCL Skeletons
2. Setting up Skeletons for Compile Mode

Converting Installed DCD III ISPF Panels to DCD IV ISPF Panels

For users with ISPF installed under DCD III with release 3.5 or later and installing DCD IV, replace the older DCDSPF libraries with the newer DCDSPF libraries and do reasonable testing to insure ISPF is working correctly.

Modifying CLISTs, Panels and JCL Skeletons

The following members need to be modified during installation.

CLISTs

DZ3DCD1 - Modify the five file names within the five LIBDEF statements to the permanent data set names (DSNAMEs) loaded from files 4 through 8 from the installation cartridge.

Panels

DZ3HC100 - Replace xxx within this panel with the name of the file (DSNAME) loaded from file 3 from install cartridge. This DSNAME should reflect the final file, which will contain 11 CASE COPY members. (See -Addendum 1- in this section, and see CASEMBRS within **DCD IV JCL Procedure Library** there.)

DZ3Z0801 - Insert within the single apostrophes within the) INIT section of this panel, one or more production COPY libraries that should always be searched when looking for COPY libraries. Look at the SYSLIB DDNAME within standard compile procs for a list of these DSNAMES. (These DSNAMEs may be changed and added to by the programmer while using the SPF panels.)

DZ3Z0806 - Change the literal from (Y) to (N) within the)INIT section of this panel as necessary to block out COMPILE, PANVALET, and LIBRARIAN respectively. If LIB='Y', consider EXT='Y' also, to block out the use of -SEL commands and only allow -EXTRACT commands to be built by DCD IV for use within Librarian to bring in programs.

- Notes on panel DZ3Z0806 -

1. Most installations set up compile PROCs calling DCD **separate** and exclusive from the SPF panels here. Additional effort may be used here to allow (not block out) COMPILE mode within DCD SPF panels. **However**, it may be appropriate to initially block out COMPILE mode from SPF panels and add later, if specifically requested by users.
2. Librarian and Panvalet should be allowed or blocked out depending on their use within your shop. If they are used at your installation, they should be allowed here.

DZ3A0455 - If COMPILE mode is allowed within SPF panels, this panel needs to be modified to allow selection of needed skeletons for COMPILE mode. (This panel, if allowed, should be modified later following the instructions given under the heading, "**Setting up Skeletons for Compile Mode**".)

(Continued…)

Skeletons

DZ3CNTRL - Modify this skeleton to point to the DSNAME which contains the control password for running this software. (See, "**Step 3 - Creating a Control Record**" and 'Installation Addendum', for determining the name of this DSNAME.)

DZ3STEP - Modify this skeleton to point to the DSNAME which contains the load modules of the DCD IV system. This file was loaded from the first file on the install tape.

DZ3LSTEP - If Librarian mode is allowed and a STEPLIB is required for LIBRARIAN, modify this skeleton to point to the DSNAME needed to invoke LIBRARIAN and delete the)CM and blanks ahead of //STEPLIB.

DZ3PSTEP - If Panvalet mode is allowed and a STEPLIB is required for PANVALET, modify this skeleton to point to the DSNAME needed to invoke PANVALET and delete the)CM and blanks ahead of //STEPLIB.

DZ3SORT - If DDNAMEs SORTMESS and SORTLIB are required to be included within the JCL for sort programs at your installations, include these within this skeleton by deleting the)CM and blanks ahead of //SORTMESS and //SORTLIB and verify the accuracy of the DDs provided.

DCDCASEC - Modify this panel to reflect a correct DSNAME within the SYSUT1 DDNAME. Replace xxx with the name of the 3rd file loaded from the DCD IV install cartridge. (This must be the same file name inserted in panel DZ3HC100 mentioned earlier in this heading.) This DSN may not be changed by the user. Proper testing using this DSN is essential. Testing of this DSN is covered under the heading, "**Testing DCD ISPF Panels Prior to Permanent Installation**".

DCDJOB - ADD needed JOBLIB, PROCLIB or other leading JOB JCL where noted in this skeleton. (See standard JCL used at your installation for these lines.) The JCL added here should be the same JCL needed for all JOBs at your installation. Optionally, these JOBLIB, PROCLIB or other JCL may instead be added individually after the)IM DCDJOB lines within the following procs:

1. DCDCASEC
2. DZ3OCRF
3. DZ3ACLF
4. DCDJCL

(Continued..)

DZ3PANVA - If Panvalet is allowed and supported, verify that the program name DZ3APANR used for executing Panvalet is correct and check if a region parameter is required.

DZ3LIBRA - If Librarian is allowed and supported, verify that the program name DZ3ALIBR used for executing Librarian is correct. Check if a region parameter is required and check if the PARM field is correct. See modifying panel DZ3Z0806 under **Panels** for forcing users to use EXTRACT only when using Librarian.

.

Changing UNIT=SYSDA in Skeletons

If UNIT=SYSDA is not valid, make changes for SYSDA globally in the following procs:

1. DZ3PANVA
2. DZ3APANR
3. DZ3LIBRA
4. DZ3ALIBR
5. DZ3MBRFE
6. DZ3RMBRF
7. DZ3OCRF
8. DZ3ACLF
9. DCDJCL

Compile Mode Skeletons DZ3COM01 through DZ3COM09

If compile mode is used, within the ISPF panels, necessary skeletons DZ3COM01 through DZ3COM09 are built and modified using skeletons DZ3COM0A as a guide.

These skeletons, if used, should be built following the instructions given under the heading, "**Setting up Skeletons for Compile Mode**".

Setting up Skeletons for Compile Mode

One panel needs to be modified, and one to several skeletons need to be built, if installation is to include building COMPILE JCL streams from DCD IV panels.

- Recommendation -

It is very strongly recommended that COMPILE mode be blocked out from these SPF panels and have users use COMPILE/DCD procs in batch mode or invoke COMPILE with DCD PROCs from the other panels. This invokes the COBOL compiler in the manner currently used by programmers for doing their COBOL compiles. Examples of combining Compile and DCD procs are given in the heading, "JCL Examples within the Aternate Compile Listing", section of this manual. If skeletons are added here or whenever standard COMPILE procs that also use DCD are modified, these skeletons will also have to be changed.

Panel DZ3A0455 should be looked at initially, then modified after all necessary skeletons are created. Instructions are given later.

Skeletons DZ3COM0A are provided as a sample for creating other necessary skeletons and should not be modified. The skeletons created must be named DZ3COM01, then DZ3COM02 in ascending order, not to exceed DZ3COM09.

Whatever compile and DCD combinations of PROCs are used in batch mode must also be set up here. For instance, if both COBOL 74 and the newer VS COBOL II are used, then a minimum of two skeletons must be used, one for each separate PROC executed. Separate skeletons may also be added for COMPILE alone, COMPILE with LINKAGE EDITOR, COMPILE with CICS, SQL, etc... A review of existing COMPILE PROCs used can be used to organize a list of the skeletons required. Also, it may be helpful to review the underlined lines below on exclusion of Librarian, Panvalet and DCD JCL from selected PROCs before organizing a list of these skeletons.

Building needed SKELETONs

Build as many skeletons as are needed for your installation. After copying DZ3COM0A to DZ3COM01 (or DZ3COM02 or DZ3COM03 etc...), the following modifications need to be made to the new skeleton: (Look at a copy of DZ3COM0A before continuing.)

1. Replace COBxxxxx on the //COB line with the name of a valid PROC currently used for compiling programs at your installation. The PROC may include steps for doing a pre-compile of CICS, SQL or others and may include steps for doing post compiler steps, such as running the Linkage Editor or software packages i.e., the CA-Optimizer. The PROC must not contain LIBRARIAN steps or Panvalet steps ahead of the COMPILE step. Also, the PROC must not contain JCL to execute DCD IV. THE JCL for Librarian or Panvalet, if used, and the JCL for DCD IV execution is built separately by the other skeletons, (in conjunction with the panels and associated programs which controls the Panels).

2. If CICS, SQL or other pre-processor steps are needed and are not within the selected COMPILE PROC, then JCL should be added ahead of the //COB line mentioned above to invoke the necessary JCL or PROC. Insure that any JCL or PROCs added do **NOT** invoke Panvalet OR Librarian steps. Also, see number 5 below for modifying the 4 sets of) SEL through) ENDSEL lines.

3. Modify the //COBOL.SYSLIN line to insert the name of a partitioned data set that routinely holds object members from COBOL compiles. Leave the symbolic (&ALINPRG) as it is, unless the object library is a sequential file, in which case it may be removed. If an object file is not created, this line may be removed. Check compiler options carefully before removing this line.

4. Leave the //COB.SYSPRINT line as it is with one exception. The LRECL of 121 and the BLKSIZE of 1210 may need to be changed to 133 and 1330 respectively if VS COBOLII compilers or other newer compilers where SYSPRINT have a record length of 133. Leave DISP=(MOD,PASS) as is. Do NOT convert to New,Pass.

5. Leave the 4 sets of) SEL & ATYPINP = x through)ENDSEL as they are unless pre-processor steps are involved. These 4 sets of statements provide the COBOL input. If pre-processor steps are involved, change the //COB.SYSIN to //PRE-STEP.INPUTDD to direct the input COBOL to those steps and then insure that correct JCL is provided to bring the output COBOL from the pre-processor steps into the SYSIN dd of the COB step.

6. If a SYSLIB dd is provided within the COMPILE PROC, then remove the //COB.SYSLIB within this skeleton. If a SYSLIB dd is not provided within the COMPILE PROC, then modify the //COB.SYSLIB to include concatenated DDs for all COPY libraries needed by the compile and fill in valid DSNAMEs.

7. If CA-Optimizer and/or Linkage Editor steps are wanted, add JCL for these at the end of the skeleton, provided they are not already included in other invoked PROCs. The JCL added may invoke other PROCs provided that DCD is not invoked from these additional PROCs.

Modifying Panel DZ3A0455

Make the following modifications to panel DZ3A0455 after all necessary skeletons have been built:

1. Add, change and delete the current four lines beginning, %1, %2, %3 and %4, so that there is one line for every skeleton built. The numbers 1,2,3,4,5, etc... match the last number of the skeletons built. For instance, 1 matches to skeleton DZ3COM01. Insert appropriate documentation describing the COMPILE PROC next to each numbered line.

2. Modify the VER line next to the bottom line to remove those numbers from 0 through 9 that do not match those lines added above.

Testing DCD ISPF Panels Prior to Permanent Installation

Concatenate the five PDSs into a copy of the TSO LOGON USER PROC. Re-log using the newly created PROC. Go into Dialog Test and invoke the DCD panels using the name DZ3DCD. With all the numerous options, control statements and features that could be tested, a full test of all features is impractical. Therefore, each installer should satisfy himself/herself that the panels are working after submitting at least one batch job in each of the four main options from the main panel DZ3DCD. See the following comments:

In the ACLF section, when testing COMPILE Mode, a return code of 1 from the DCD step is normal. The following RETCMPLR step should not be executed during a successful run.

In the CASE files section, (one of the four main options), option 5- Copy a selected COPY member- must be tested to verify the DSName entered in skeleton DCDCASEC. Testing may be made with any one of the eleven CASE files. An output DSN must be provided for copying.

Permanent Installation of the ISPF Panels

Permanent installation may be done after the DCD members from the five PDSs have been made available within the appropriate DD names within the user's TSO LOGON USER PROC. For permanent installation, find an appropriate selection panel that currently exists with room for at least one entry and add a line similar to the following to that panel:

```
%n      +Data Correlation & Documentation for COBOL programs.
```

where n is a letter or number and then add an appropriate entry in the) PROC section of that panel as follows:

```
n,‘CMD(DZ3DCD1)’
```

Re-test to see that the DZ3DCD panel is brought in correctly.

- Addendum 1 -

DCD IV JCL Procedure Library

DCD IV.CNTL contains the following members:

CASEMBRS	Contains 11 (eleven) CASE COPY members, all separated by the keyword CASE. See CASE files for use.
COBOLPGM & COBOLPG2	Small COBOL programs which may be used for testing DCD IV.
COMACL	Sample PROC for executing DCD IV in Compile Mode.
DCDACL	Sample PROC for executing DCD IV in Independent Mode.
LIBACL	Sample PROC for executing DCD IV in Independent Mode, taking the source program from a Librarian library.
PANACL	Sample PROC for executing DCD IV in Independent Mode, taking the source program from a Panvalet library.
DCDCNTRL	Password control record. This must be modified before doing any testing.
DCDCOBOL	Sample PROC for executing DCD IV to produce Other COBOL Reports.
LIBCOBOL	Sample PROC for executing DCD IV to produce Other COBOL Reports, taking the source programs from a Librarian library.
PANCOBOL	Sample PROC for executing DCD IV to produce Other COBOL Reports, taking the source program from a Panvalet library.
DCDFETCH	Sample PROC for newer MBRFETCH. See Table of Contents in B Section.
DCDJCL	Sample PROC for producing JCL PROC Analysis Reports from JCL PROCs.
INVMAST1	A test COPY member used by test program COBOLPGM.
MBRFETCH	Sample PROC for pulling in members from a partitioned data set. These members may be COBOL programs, COPY members or JCL PROCs.
SELECT	A file used in testing Tracing & Analysis with test program COBOLPGM
TCOMACL	Testing JCL for Compile Mode and the COMACL PROC
TDCDACL	Testing JCL for the DCDACL PROC and Independent Mode
TDCDCOBO	Testing JCL for the DCDCOBOL PROC for producing Other COBOL Reports
TDCDJCL	Testing JCL for the DCDJCL PROC for producing JCL PROC Analysis Reports

Nine of the members are **PROCs,** which should be tailored for use at the user's installation.

Four of the members **(TCOMACL, TDCDACL**, **TDCDACL, TDCDCOBO** and **TDCDJCL)** are JCL for testing four of the **PROCs.**

One of the members **(COBOLPGM)** is a sample **COBOL** program, which is accessed by the three members **TCOMACL, TDCDACL** and **TDCDCOBO**.

One of the members is **DCDFETCH**, a replacement available for PROC **MBRFETCH**.

One of the members **(DCDCNTRL)** is an incomplete control record, which must be modified before any testing is done. See **Step 3 – Creating a Control Record** within this section.

For testing the Librarian or Panvalet **PROCs,** consult the examples mentioned under, "**Step 4 - Testing DCD IV**"**,** and fill in necessary information for Librarian or Panvalet data set name, valid COBOL program name and Librarian password. If **COPY** members are present, include a **//DCD.COPYLIB DD** as shown in Example 2 in either the Alternate Compile Listing Facility section, and the Tracing & Analysis and Other COBOL Reports Facility section.

- Addendum 2 -

Use of SYSTRACE and TRACEIN DDs for Customer Support

This page is provided as informational and should not normally require user attention.

A de-bugging language for looking at the intermediate files used within DCD IV may be used by adding two additional DD's.

These two DD's are explained below:

```
//DCD.SYSTRACE     DD     SYSOUT=*,DCB=BLKSIZE=133
```

This is used as a print file for printing out the de-bugging information.

```
//DCD.TRACEIN       DD     *
AFTER  progname  PRINT {ALL or nnnn] RECORDS FROM DCDWKnn
/*
```

This DD is used to input 1 to 25 AFTER commands to direct the printing of works files after the execution of internal programs within the DCD IV system.

The progname and number (n) within the AFTER command need to be provided by MARBLE Computer, Inc.

No other options need to be turned on to invoke this feature.

- Addendum 3 -

DCD IV

INSTALLATION ADDENDUM

TO BE INSERTED HERE

For ACTIVE Users – Insert GREEN Installation Addendum

For TRIAL Users – Use Pink Installation Addendum

(For Active Users)

You already have this password on file if you are an "Active" user of DCD IV. If you require assistance in obtaining a password, please call our office at 1-800-252-1400.

DCD IV will not run unless the following is done:

> Modify the DSN in the //CONTROL DD line in all of the DCD IV PROCs with the exception of MBRFETCH. Make this DD point to a member of a PDS containing a date record shown below.

An example showing control statement input for illustration only of this feature along with the format of date and password are shown below:

```
//CONTROL DD *
mm20yy-XXXXXX          (this control information is obtained from Marble Computer, Inc.)
```

(For Trial Users)

Contact Marble Computer at 1-800-252-1400 or see supplied **'- Addendum 3 –'** for Trial Users.

End of Installation Section

Release 4.0

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Release 4.0

DCD IV

SPF (System Productivity Facility) PANELS

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With the industry turning more and more to on-line applications, MARBLE Computer, Inc. has taken on the challenge of providing availability to it's customers on an on-line SPF panel interface for our DCD IV software.

To make use of these panels, a client must have Version 2 or later of the ISPF Dialog Manager and have ISPF/PDF installed.

BENEFITS

FULL DCD IV FUNCTIONALITY

In many Data Processing Departments, individual users do not have a DCD IV user's manual which causes many features of DCD IV to be unused or unnoticed. With the interactive SPF panels the user will be drawn to understand full DCD IV functionality. This is due to our IBM/OS DCD IV user's manual being placed on either HELP or SELECTION panels to guide users right to the function he/she wants to know about. The manual, while still functional, is no longer needed by each user to understand the capabilities of DCD IV.

USER-FRIENDLY INTERFACE

Selection panels will be designed to make the user aware of every feature of DCD IV in a friendly way, while the printed manual is still available as a reference guide.

ALLEVIATION OF JOB CONTROL LANGUAGE MODIFICATIONS

The user is not required to know OS JCL as all JCL will be built and submitted automatically as a batch job from the ISPF panels. Therefore, there is no need to modify JCL job streams as in the past.

INTERACTIVE ERROR DETECTION

As errors are detected on-line, error messages will be displayed describing what action needs to be performed on the users behalf. This will speed up the job submission process by both reducing JCL errors and reducing wasted CPU time due to running jobs that do not produce the anticipated results.

SAVES TIME

On new tasks the users time will be saved by 50% - 75% thus eliminating the need to understand all the option and JCL that are required to achieve desired output reports produced by DCD IV. With this time savings, the user can perform project related tasks instead of spending large amounts of time understanding the parameters and JCL that drive DCD IV.

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Use of this Section

This section is designed to give a partial overview of how the ISPF panels are used. Full coverage is not attempted here. There are about 240 panels (over 150 are HELP panels and 90 are panels that are called upon as necessary to complete user requests). These panels are assisted with more than 55 individual programs to help insure error free submission of DCD IV jobs.

In addition to error free submission of jobs, features that are generally hidden unless one has carefully and thoroughly read the entire DCD IV manual, are made available as a user selects one or more features or options.

Selected panels for completing user requests and some associated HELP panels from the ACLF facility only are shown in this section.

List of Panel Exhibits

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3. Alternate Compile Listing - Support Options H-7
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List of Help Panel Exhibits

1. Help Screen for 'Main Selection Panel' H-10
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Selected Panels for Using the ACLF

Main Selection Panel

DCD IV (Data Correlation & Documentation)
OPTION = = =>

–

1 ACL - Alternate Compile Listing

2 OCRF - Other COBOL Reports Facility

3 CASE - Re-engineering work files

4 JCL - JCL Reports

X Exit

DCD IV spf release n.n

Selection Panel for ACLF

Alternate Compile Listing - for 1 COBOL program
OPTION = = =>

–

1 Reports available and overview

2 Useful information

3 Reselect options & Submit batch job

4 Submit batch job

X Exit

This panel is only displayed if option 3 is selected on the 'Selection Panel for ACLF'.

Alternate Compile Listing - Supporting Options
Change options if required

1. CAn - _ (Enter 1, 2, or 3 for special CA-Optimizer formatting)
2. C68 - _ (Enter Y if COBOL program is older 1968 COBOL)
3. DNF - _ (Print an error message if data names are unresolved)
4. EIB - _ (Insert COPY member DFHEIBLK for CICS program. Enter Y if CICS program is not run through pre-compiler)
5. ERR - _ (Enter N to not print error messages)
6. FTX - _ (Enter N to remove or F to force FROM-TO pos in 73-80)
7. LNCNT - _ (Line count for DCD IV reports)
8. NIS - _ (Sort Narrative in Proc. Div. sequence for each field)
9. **Other** _ (Enter Y for less used options not shown on this panel)
10. QUO - _ (Enter Y if double quote, not single apostrophe is used for non-numeric literals) - Enter D for self-determine
11. R3N - _ (Use narrative from 85 COBOL rel. 3 or more on report)
12. REGION _ (REGION=3072K or larger is recommended)
13. SORTREG _ (SORTREG=300000 is recommended)
14. UNR - _ (Enter N to omit printing unreferenced names in the DATA and PARAGRAPH Analysis reports.
15. **VS2** - _ (Enter Y for newer VS COBOL II - 1985 COBOL)
16. 370 - _ (Enter Y if COBOL 370, MVS & VM, 390, or Enterprise COBOL)

If option 9 is selected the following panel would appear.

--Alternate Compile Listing - More Options --
Change options if required

1. ASK - _ Enter N to ignore SKIP1, SKIP2, SKIP3, lines)
2. CHECK - _ Enter N to ignore checking previous seq nbrs)
3. CLN - _ Enter Line Count used in COBOL compile step)
4. COAID - _ Enter Y if using COBOL/Aid software)
5. F16 - _ Enter Y for FROM position of fields in columns 1-6)
6. IDD - _ Enter Y to include DATA DIVISION Literals)
7. IEJ - _ Enter Y to ignore EJECT lines)
8. JCL - _ (Enter Y for to change **SPACE** or **BUFNO** in JCL)
9. NRS - _ (Enter Y to insert a blank line to separate narrative in the DATA DIVISION. Do not use with CA1 OR CA3.)
10. PMO - _ (Enter N to omit printing HEX OFFSETs in Compile Mode)
11. RES - _ (Enter N to not resolve COPYs; this may produce errors)
12. SRE - _ (Enter N to not expand COPY with SUPPRESS members.)
13. STOP - _ (Enter Y to not process DCD IV in compile mode.)
14. VR3 - _ (Enter Y for older 1974 COBOL (version 3 or earlier) where SKIPs and EJECTs did not generate sequence numbers.
15. USER - _ (Enter other options here - Use HELP or Manual)

This panel is always displayed for either option 3 or 4 on the 'Selection for ACLF'.

Specify Type Input

Specify mode, type input & COPY libraries

COMpile mode = = =>_ (Enter Y to run with a COBOL compiler, or enter N for Independent of COMpile mode)

Type Input = = =>_ (Enter C, P, L, or S to indicate type input)

Select **C -Select from Partitioned Data Set**
P -Select from Panvalet **(COBOL program will**
L -Select from Librarian **be taken from the type input**
S -Select from Sequential File **specified)**

COPY Library #1= = =>_
COPY Library #2 = = =>_
COPY Library #3 = = =>_
COPY Library #4 = = =>_
COPY Library #5 = = =>_
COPY Library #6 = = =>_

Notes: a) Enter fully qualified PDS names of files with COPY members.
b) Do not put quotes around the Data Set name.
c) DSN(s) to use here may be taken from SYSLIB DD IN COMPILE PROC.

The following panel is only displayed if P is entered for 'Type Input' above.

Panvalet Panel

------- Panvalet Data Set Name ---------
AND program name

Data set name = = =>_

a) Enter a fully qualified name for a Panvalet Data Set which contains user COBOL programs and INCLUDEs.
b) Do not put quotes around the Data Set Name.

Specify program = = =>_
a) Enter PROGRAM name

The following panel is only displayed if **C** is entered for 'Type Input'.

Select from Partitioned Data Set Panel

-- Partitioned Data Set and Program for --
input to 'Alternate Compile Listing'

PDS Name = = =>_

Notes on specifying Partitioned Data Set:
a) Enter a fully qualified PDS name.
b) Do not put quotes around the Data Set Name.
c) The file must be partitioned, catalogued AND contain the program specified.

COBOL Program = = =>_
a) Enter 1-8 character COBOL program name which resides on the Partitioned Data Set Specified above.

Job Card Panel

.....Enter/Verify JOB Card .....
Enter/Verify JOB card - (Use up to 4 lines)

FOR LOGON ID: **MACC01** SUBMIT JOB = = =>_ (Y OR N)

```
//MARBLE02  JOB  (MARBLE,R052),MSGLEVEL=1,
//              NOTIFY=MARBLE,PRTY=9,TIME=(1,30),MSGCLASS=Q
//*
/*JOBPARM L=999
```

Selected HELP Panels

Help Screen for 'Main Selection Panel'

DCD IV (DATA Correlation & Documentation)

Four Facilities to chose from:

1. ALCF produces a source listing of the program similar to compile listing with meaningful COBOL documentation to the right of the source code.
2. OCRF is a reporting facility on one (or several programs) for various reports **such as** cross referencing of fields, tracing data names through a system of programs showing direct and indirect usage, charting a hierarchy of all the programs, and LAYOUTs of records.
3. CASE for producing work files to use in various aspects of COBOL Re-engineering.
4. JCL produce JCL reports showing DSNAMEs and DDNAMEs.

Main HELP Panel for ACLF

---DCD IV "Alternate Compile Listing" ---Overview of Reports ---
SELECTION = = =>_

The 'Alternate Compile Listing' can be run independently of a COBOL compile or it can be run with the compiler to produce one listing combining the compiler and ACLF listing together.

1 Source Listing
2 CALL Statements
3 COPY Statements
4 Figurative Constants
5 Literals
6 Special Registers
7 DATA DIVISION Condensed Cross Reference
8 PROCEDURE DIVISION Condensed Reference
9 CASE Files

First HELP Panel for #1 on Main ACLF HELP Panel

--- DCD IV Overview of ACLF Source Listing

This report is the principal ACLF report. It list the source listing as does the compile listing, and additionally adds narrative generated by DCD.

For the DATA DIVISION, condensed look-alike PROCEDURE DIVISION code is produced along side each data field as shown here:

```
320  05  WS-NEXT-COL       PIC S9(4).    > ADD 1 TO #  (1019)
                                             IF #  > WS-MAX-COL @321 (1005)
                                             MOVE 02 TO # (1115)
321  05  WS-MAX-COL        PIC S9(4).    > IF WS-NEXT-COL @320 > #  (1005)
322  05  WS-MAX-PD-DIGS    PIC S9(3).    > IF # =3 (942,965,1022), 4 (945,968,1025,1064)
                                              PERFORM-UNTIL # = ZERO (951,978)
```

The # in the narrative is substituted for the data name on the left.
An @ number is used to show where another data field is located.
Numbers in parentheses are used to show Procedure Division locations.
Similar Procedure Division statements are grouped together.
Some statements such as the PERFORM are condensed.

(Continued)

First HELP Panel for Supporting Options

DCD IV Specifying Supporting Options

The following options affect the running of DCD IV.

1. CA1, CA2, or CA3 - For CA-Optimizer users. Option CA1 and CA3 move PROCEDURE DIVISION displacements into columns 73-80 and print columns 128-133 respectively to save paper when formatting DCD IV narrative. Option CA2 does what CA1 does plus selectively saves Some of the DATA DIVISION CA- data in cols 73-80.
2. C68 - Use when older COBOL 68 is used.
3. DFN - May be set NODNF to not print error messages when matching names are missing in the Data Division.
4. EIB - Insert COPY member DFHEIBLK FOR CICS programs to resolve names such as EIBDATE, and EIBTIME.
5. ERR - May be set to NOERROR to omit the printing of all error messages.
6. FTx - Default is to move the FROM-TO position for data fields into columns 73-80 if these positions are blank. Use N to stop this. Use F to force the move.

(Continued)

HELP Panel for CASE Work Files

---- DCD IV Trapping Useful Information on Work Files

DCD IV has access to information on each COBOL program it processes.

Much of this information is available to the user in the form of sequential files. These files are named CASE files.

This information may be used for any of the following purposes:

a) Loading a Data Dictionary
b) Loading a Repository
c) Assisting with a field expansion project
d) Doing any type of Re-engineering project with COLOL programs

The user may rebuild this information to fit their needs. COPY Members (containing 01 records) are available for writing small COBOL programs to access this information. More information is available by looking at the panels under the heading 'DCD IV CASE Files'.

(End of Trapping Useful Information HELP Panel)

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